THE RAILWAY GAZETTE
A Journal of Management, Engineering and Operation
INCORPORATING
Railway Engineer · TRANSPORT · The Railway News
The Railway Times · Herapath's Railway Journal · RAILWAY RECORD.
RAILWAYS ILLUSTRATED · ESTABLISHED 1835 · Railway Official Gazette

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Annual subscription £4 10s. 0d. post free. Single copies, Two shillings
Registered at the G.P.O. as a newspaper. Entered as second-class matter in U.S.A.

Vol. 95] FRIDAY, SEPTEMBER 21, 1951 [No. 12

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Railway Wage Claim

IT is not likely that the meeting of the Railway Staff National Council adjourned from Tuesday until today (Friday) will result in agreement on the concerted wage claim by the three railway trades unions. The Railway Executive, as we pointed out last week, has gone far, in the present state of railway finances, to meet the unions' demands, and some of its proposals as appears from the details given on other pages, envisage wage rates which do not compare badly with those in outside industries, given the compensations of railway service. On the trades union side, the General Secretary of the National Union of Railwaymen, Mr. J. B. Figgins, has termed the increases offered by the Executive "miserable", and has talked vaguely of strike action—presumably in the light of the suspension of Statutory Order 1305 by a new Order which does not prohibit such action. Meanwhile, the conciliation machinery provides for reference of the dispute, should there be no agreement at the Railway Staff National Council, to the Railway Staff National Tribunal, and it appeared last week that this is what the unions wished. It is also possible, however, under the new Industrial Disputes Order, to report the dispute to the Minister of Labour; this course would probably result in the Minister referring the dispute back on the ground that the existing negotiating machinery was not exhausted, so that in any case it would be reviewed by the Tribunal. The situation fortunately differs from that arising last February, when the three unions lodged separate and largely competitive claims, for the present claim is concerted, and the attitude of the unions generally is more restrained. In contrast to last February, when the Railway Executive made the wage increases dependent on improved use of manpower, its offer does not associate the increases with greater output; as the latter is already under discussion, and has been for eight months without any appreciable result, any stipulation regarding productivity would be superfluous. It can only be hoped that the conciliation machinery will be used to the full, without any uncalled-for influence, as last February, by the Minister. Whatever agreement, however, is achieved, must have the unsatisfactory character of a compromise.

Mr. A. C. Hartley

THE variety of engineering interests represented by Presidents of the Institution of Mechanical Engineers has always been representative of the diverse and progressive outlook of that Institution. This year the office of President is filled by Mr. A. C. Hartley, who, as Consultant to the Anglo-Iranian Oil Co. Ltd., maintains that tradition, and at the same time adds lustre to the Institution's prominence in the promotion of engineering research. Mr. Hartley's wide experience in the oil industry includes the design and development of the Kirkuk-Mediterranean desert oil pipe-line, and in other directions he has a notable record in research and experimental work. During both world wars Mr. Hartley has carried out valuable experimental work and during the recent war he assisted in the development and production of a stabilised automatic bomb-sight, used with such success against the German battleship *Tirpitz*. Mr. Hartley also worked on the invention, development, production and laying of the Pluto cross-channel petrol pipe-line and, as Technical Director of the Petroleum Warfare Department, was concerned with the Fido fog-clearance scheme on airfields.

Mr. R. M. T. Richards

IT is little more than a year since Mr. R. M. T. Richards retired from the Southern Region. Elsewhere in this issue we record with a regret that will be shared by a large circle of railwaymen, not only in this country, his death at the age of 61. During practically the whole of his railway career, which commenced in 1908 when he joined the South Eastern & Chatham Railway, Mr. Richards's vigorous activities were concerned with the traffic departments of the Southern Railway or its predecessors. He was very much a "Southern man" and, at the time of his retirement, he was holding the position of Deputy Chief Regional Officer, a post to which he had been appointed after serving as Traffic Manager since very shortly after the outbreak of war. In that position he was responsible for both commercial and operating matters, a heavy enough responsibility in peacetime, but during the recent war, more especially in view of the position of the Southern Railway, one which carried with it many additional responsibilities and anxieties inseparable from the exigencies of the times. The strain of those years left their mark on him; his decision to retire in April last year came as no surprise to many of his friends.

Further Discussions on G.N.R.(I.)

ANOTHER meeting to discuss the future of the Great Northern Railway (Ireland) has taken place, this time in Dublin, between Ministers of the Irish Republic and Northern Ireland. It is believed that "substantial progress" was made, and the directors of the company are expected to meet the Ministers this week, suggesting that a new offer will be forthcoming. Meanwhile the company has issued a summary of its position for the guidance of the Ministers and for publication in the press, the only means

by which it can put its case before the public. It reiterates the plea of the shareholders for the question to go to arbitration. The break-up value of the assets as at June 30, 1951, is shown to be £12,219,746, a worth which the Governments proposed to acquire for £3,900,000. " In the degree that the services rendered by the company's system with its integrated assets are indispensable," it asks, " have not those assets a value greater than would be realised in the disintegration of a break-up sale?" It was the doubt that the company would ever receive a square deal which ruled the quotations for the stocks in the three years 1948-1950, the basis adopted by the Governments for their " offer." Losses sustained by the undertaking in the North are solely the result of the unfair treatment there accorded to its road services.

Overseas Railway Traffics

SUBSTANTIAL advances in Paraguay Central traffics were continued during the two weeks ended September 7, and as increases have been maintained at a high level since July 1, receipts for the current ten weeks are now G1,536,025 higher, at G3,365,605. Traffics for the week ended August 31 improved by G139,578 and in the succeeding week were G172,954 higher at G367,889. Antofagasta (Chili) & Bolivia traffics also continued to improve during the fortnight under review, with a £41,740 advance to £224,150, and on the aggregate were up by £1,959,576 at £4,245,260. During July, Gold Coast receipts rose by £17,091 to £254,368, so that at the end of 17 weeks total traffics amounted to £1,058,909, as compared with £959,795 for the equivalent period of 1950-51. Following a $528,500 improvement in August, Taltal aggregate receipts were $1,086,600 higher, at $3,855,000 for the ten weeks since the beginning of the current financial year.

Control of Ports

FAR-REACHING changes in the control and administration of some principal commercial ports in this country are recommended by the Docks & Inland Waterways Executive in its reports presented to the British Transport Commission, of which a short summary is given elsewhere in this issue. The reports tend generally to recommend a measure of centralisation of control over smaller undertakings. The most pressing problem, however, is that of labour relations at major ports. As regards London, attention is drawn to the division of responsibility between the Port Authority and the National Dock Labour Board, which has contributed to the labour troubles in the port. A thorough examination of the application of the Dock Labour Scheme, states the report, is necessary in the interests of efficient and harmonious operation. On Merseyside, it is said, greater efficiency would result from more effective control by the port authority over stevedore and porterage services.

Reasons for C.I.E. Rates Increase

SOME very heavy increases in the price of materials since 1938 were disclosed by Mr. T. C. Courtney, Chairman of Coras Iompair Eireann, in an explanation of the reasons for the increases in C.I.E. rail and road passenger and freight charges which came into force on September 10. Even since last autumn there have been increases in wages and salaries and the cost of materials which will bring the board's losses in the year ending March 31 next to about £2,300,000. The greatest increase since 1938 has been in the price of timber—407 per cent.; coal is now on an average 140s. a ton, compared with 28s. 9d. The C.I.E. Act of 1950 provides that the board charges shall enable it to meet all its obligations; the new rates, it is hoped, will bring in £1,179,000 but there will still be a deficit of over £1,000,000, and the Government will be asked to make up the difference. Under the new scale of charges, rail and road passenger fares have been raised by 14 per cent. single, and 12½ per cent. return; freight rates are increased by 16⅔ per cent. Mr. Courtney said that but for the increased costs of labour and materials since last autumn the undertaking would have been made self-supporting by the new extra charges. If sufficient additional traffic could be attracted, the losses in working would be reduced, if not eliminated.

Scientific Selection of Railway Apprentices

ALL candidates for apprenticeships in the South African Railways will be tested in future individually by trained staff of the new Personological Section in Pretoria, under the guidance of a former university professor in psychology. More than 2,000 candidates apply during the year for an average of approximately 1,000 apprenticeships. The new method of selection based on scientific principles already applied successfully in other countries, aims at avoiding the " round peg " in the " square hole." The candidate will first submit a written application. Questionnaires will then be sent to him, his parents, and school; from the information thus obtained, a preliminary classification of candidates will be made, and the different groups will undergo efficiency tests, aided by specially-designed instruments. From these, qualities such as initiative, endurance and memory, will be determined, the results enabling the Personological Section to make a further classification of candidates. The Section will then make its recommendations to the Apprentice Selection Committee, which will be responsible for the appointments. While aptitude testing is at present to be confined to railway apprentices, the scope of the organisation is to be extended to other branches.

Limits for Train Speeds on Curves

WHEN selecting the value of equilibrium cant for any curve, regard must be paid to the speed limit for the route and to the average speeds of the various types of traffic, for, though it is not desirable that the value selected should be such as to impose a restriction of speed on the fastest trains, excessive weight on the low rail of heavily canted track must be avoided on lines where there is a predominance of freight traffic. Since 1949, having in mind the differences in practice which existed among the former main-line railways as to the limiting values for superelevation or cant of track, rate of gain of cant, etc., tests have been carried out by the Railway Executive to determine the limiting values for such factors consistent with passenger comfort and safety. These tests, recently concluded, have at the same time covered the phenomena of derailment at low speed on curves, and the redistribution of weight on wagon wheels due to twist. Limiting values for the above factors have now been laid down for general use on British Railways and it is considered that curves designed in accordance with the new rules will ensure the maximum of safety and riding comfort.

A Novel Bridge Superstructure

A NEW type of bridge superstructure designed and fabricated for a highway bridge in Washington State, U.S.A., is described elsewhere in this issue. Some important advantages are claimed for it, and in these times of costly maintenance and steel shortage it might be worthy of consideration either for railway road overbridges or, with suitable modification, even for underbridges. For instance, it might be useful for overbridges across railway yards or junctions where long spans without intermediate support are essential, or for such spans on a skew. The usual objection to the box girder that its interior cannot be inspected or, if necessary, be painted, does not apply in this instance, and the plates are or may be reasonably thick. Externally, painting costs would be reduced to a minimum by virtue of the flat plates unbroken by stiffeners, angles or flanges, apart from the 2¾-in. bottom flange which, with the continuously-welded joint, can be sloped off so that it collects no moisture. For underbridges the design would have to be strengthened considerably and a horizontal instead of the cambered top flange would be necessary, but its low upkeep and resistance to corrosion may appeal to the maintenance engineer.

4-6-4 Locomotives for Victorian Railways

ELSEWHERE in this issue are described and illustrated the 4-6-4 "R" class locomotives for the Victorian Government Railways, 70 of which are at present under construction at the Hyde Park Works of the North British Locomotive Co. Ltd. In view of the probability of the unification of the Australian gauges, which was referred to in our March 17, 1950, issue, the locomotives are designed for conversion from the 5 ft. 3 in. to 4 ft. 8½ in. gauge. The engines are built with bar frames cut from rolled slabs and finished machined to a thickness of 5 in. The firebox is of Belpaire design and incorporates Nicholson thermic syphons; firing is by stoker unit, the engine for which is situated below the cab floor. Steam distribution is effected by 11 in. dia. piston valves actuated by Walschaerts valve gear. The equipment includes a speed recorder and staff exchange apparatus.

Dynamic Braking

IN a paper on dynamic braking of steam, diesel, and gas-turbine locomotives, which he read to the Institution of Locomotive Engineers on September 19, Mr. J. L. Koffman said that the practice of braking railway vehicles by the crude method of pressing blocks against the revolving wheels served well enough in the early days. In the last 50 years, however, with the altered conditions prevailing in railway transport, the ability of these conventional brakes to digest the energy of motion seemed now to have approached a limit for really high-speed trains. Referring to American railways, he said that the use of dynamic braking with diesel-electric locomotives, without using the diesel engine, had proved most successful on the Atchison, Topeka & Santa Fe Railway, where brake block wear had been reduced by 60 to 70 per cent.

Thermal cracks represent the most serious wheel defects encountered in railway operation, and the expenditure incurred in inspection, together with the cost of replacing defective wheels involved the railways in a heavy expenditure annually. While these remarks referred particularly to American railways, which handle large freight traffic and heavy passenger rolling stock, they were applicable perhaps in lesser degree to railways in other countries, and great importance must be attached to the economic losses caused by friction to industry. Mr. Koffman is of the opinion that the time had arrived when more consideration should be given to the reduction of wastage caused by conventional braking methods and particularly in view of the increases in the cost of brake blocks and tyres.

If and when British railways were electrified it would doubtless be found desirable to increase the present low speed of freight trains to secure a proper return for the large amount of expenditure required for electrical equipment. This would involve the provision of some form of power brakes and increased tyre and brake block wear. It was virtually only in the field of electric traction that any positive contribution had been made towards the less destructive methods of braking. There were for other forms of traction considerable possibilities in using the source of propelling power to deal also with the kinetic energy dissipated during retardation of trains. A number of steam locomotives used on rack railways and hilly adhesion lines, notably in Central Europe, are fitted with Riggenbach brakes. Sufficient experience had been gained and the information was available to any who wished to make use of a simple and effective means of controlling train speeds.

In the field of diesel traction the use of dynamic braking should be even more attractive because of its simplicity and effectiveness. The experience gained with road vehicles had shown no increase in maintenance requirements of either engines or transmissions and there was a substantial reduction in brake shoe and drum wear. The use of exhaust brakes in the case of railcars was most attractive and the author considers its adaptation should be fostered by both manufacturers and operators. Regarding the dynamic braking of gas-turbine locomotives incorporating an electric transmission, dynamic braking could be applied in a similar way to that adopted with diesels; alternatively, it should be possible to feed the current to the dynamos, the energy being used to drive the compressor which could provide adequate brake power.

Considerations of weight, first cost, and so on, might, remarked Mr. Koffman, lead to a preference for turbo-mechanical locomotives. To achieve the necessary elasticity the power plant would comprise a compressor driven by a turbine, while a separate turbine would be used to drive the wheels, the latter unit being thermally connected either in series or in parallel with the compressor unit, *i.e.*, the hot gases passing first through the compressor turbine and then through the power turbine. The torque ratio obtainable by such an arrangement would be limited, and it was suggested that the use of multi-speed transmission incorporating two or three gears also would be desirable to ensure operation within the economic working range. If the usual synchro-mesh transmissions were used in conjunction with a multi-plate clutch between turbine and transmission, as soon as the clutch was disengaged, before changing gears, the power unit would tend to "run away" and reducing the fuel supply would not alleviate the tendency.

A remedy could be obtained by providing a freewheel between the compressor group and power turbine. When changing gears the driver would reduce the fuel supply and disengage the clutch. The power turbine would tend to race, and the compressor group would slow down, thus engaging the freewheel which couples the power turbine to the compressor group. The compressor would then reduce the speed of the whole power plant. Following the gear change, the main clutch would engage and the fuel supply be increased, while the compressor turbine would accelerate at a higher rate than the power unit, thus disengaging the freewheel, and the vehicle would accelerate. Apart from the relatively small number of gas-turbine locomotives in use at present, this type of motive power has a future, and it is suggested that the use of the compressor as a means of retarding trains should be considered at an early stage of its development and not brought in as an afterthought.

Winter Train Services, London Midland and Eastern Regions

IN the winter timetables of the London Midland Region there are some important train cancellations. In the printed timetables, the 10.30 a.m. ("Manxman") from Euston to Liverpool and the 11.10 a.m. from Liverpool to Euston are withdrawn; and since the timetables were published special announcements have also withdrawn the 8.20 a.m. (except on Mondays) and 6.55 p.m. (except on Fridays) from Euston to Birmingham and Wolverhampton, and the 9.55 and 10.55 a.m. ("Midlander") from Wolverhampton and 10.30 and 11.30 a.m. from Birmingham to Euston. As the result of London Midland and Western Region cancellations, there is now no early morning fast service from London to Birmingham, and the later 9.5 and 9.10 a.m. down trains take 2 hr. 26 min. and 2 hr. 40 min. respectively; there is a gap in the up service from 10 a.m. to 12 noon owing to two consecutive L.M.R. withdrawals; and the withdrawal of both the 6.55 p.m. from Euston and the 7.10 p.m. from Paddington, except at week-ends, leaves only the 7.5 p.m. from Euston at this hour, taking 60 min. longer on the journey than the 6.55 p.m.

With the alterations in Euston departure times introduced this summer, to conform to the new systematic departure arrangements, the Barrow and Whitehaven section of last winter's 12.5 p.m. from Euston to Liverpool is transferred this winter to the 11.45 a.m. from Euston to Manchester; the 12.30 p.m. ("Red Rose") to Liverpool continues its 3¾ hr. non-stop run to Merseyside. From the summer service the late 7.55 p.m. departure of the Stranraer boat express from Euston (in place of last winter's 6.30 p.m.) also is continued, with the new 6.20 p.m. express from Euston to Crewe, Wigan, Warrington, and Preston that was provided to maintain the previous evening

facilities to these towns. Of the services from St. Pancras, the 2 p.m. to Bradford and the corresponding 9.12 a.m. from Bradford (9.41 a.m. from Leeds) to St. Pancras are withdrawn on Tuesdays, Wednesdays, and Thursdays. The only acceleration of any note on the London Midland Region is that of the down "Royal Scot," the time of which over the 141 miles from Crewe to Carlisle is cut from 183 to 170 min., and with cuts in time north of Carlisle also this train reaches Glasgow Central at 6.10 instead of last winter's 6.35 p.m. Curiously, however, the 1.15 p.m. down "Midday Scot," though much the lighter of the two trains north of Crewe, is still allowed 184 min. for the Crewe-Carlisle run.

In the Eastern Region, the principal interest continues to centre on the Eastern Section (former G.E.R.), over which the extremely enterprising times of the summer, made possible by the advent of the new standard class "7" Pacifics, continue to operate almost without alteration. All the fastest Liverpool Street-Norwich trains remain on their fast schedules, the only minor slowings (5 min. in each case) being that the 12.30 p.m. down has a Marks Tey stop (to replace the connection given previously by the 12.36 p.m. down Clacton train, withdrawn for the winter), and the 8.45 a.m. from Norwich waits 8 min. instead of 3 min. at Ipswich to attach a through portion from Yarmouth at 8 a.m., instead of the previous independent 8.20 a.m. from Yarmouth to Liverpool Street.

As compared with the winter of 1950-51, the thirteen daily express services from Liverpool Street to Ipswich average 91 instead of 104 min., the ten Norwich trains 155 instead of 179 min., and the five principal Cromer trains 198 instead of 228 min., with similar accelerations in the up direction. The withdrawals of Clacton "even interval" trains correspond with those of the previous winter. Of other alterations, the most notable is that from October 8; to conform with Central European time during the winter, the "Hook Continental" will leave Liverpool Street at 7.30 instead of 8 p.m., and the "Day Continental" at 9.30 instead of 10.5 a.m.

On the former G.N.R., the 2.18 p.m. from Kings Cross to Leeds and Harrogate is withdrawn, and a Harrogate portion is run instead in the 1.18 p.m. train, which calls additionally at Grantham, Newark, and Retford, and reaches Leeds 38 min. later, at 6.1 p.m. A relief express is run from Kings Cross to Leeds and Bradford, without restaurant car, on Mondays, Fridays, and Saturdays at 12.55 p.m. due in Leeds at 5.7 p.m. In the up direction the 11.20 a.m. from Leeds to Kings Cross also runs on Mondays, Fridays, and Saturdays only. Most of the times between Kings Cross and both Leeds and York are slightly slower than those of last winter. On the Great Central Section no changes of any note have been made.

As to refreshment services, there are wholesale changes in the Eastern Section from restaurant to buffet cars. The trains concerned are the 9.30 ("Norfolkman") and 10.30 a.m., 3.30 ("Broadsman"), and 5.30 p.m. Liverpool Street to Cromer; 6.45 and 8 a.m., 3.45 and 4.45 p.m. Cromer to Liverpool Street; 8.30 p.m. Liverpool Street to Ipswich and the return train at 7.50 a.m. from Ipswich; 5.51 p.m. from Liverpool Street to Norwich *via* Cambridge, and the 1.45 p.m. from Norwich to Liverpool Street *via* Ipswich; the 12.15 p.m. from Marylebone to Manchester and the 2.5 p.m. from Manchester to Marylebone. The "North Country Continental" also has a buffet car, which works between Harwich and Sheffield only, so enabling a single car to serve the train in both directions. New buffet car services are provided in the 7.20 a.m. from Grantham to Kings Cross and the 10.40 a.m. semi-fast from Kings Cross to Grantham; also, from October 1, in the 8.15. a.m from Lowestoft to Leicester and on the 3.15 p.m. from Leicester to Lowestoft.

In the London Midland Region, the 8.15 a.m. from St. Pancras to Manchester, which in the summer had its restaurant car replaced by a buffet car, now loses that also, and the same applies to the 1.45 p.m. from Manchester to St. Pancras, which used to attach the same car at Derby. It is surprising that no refreshments should be obtainable on important trains making journeys of such length as this. One of the daily through workings between Newcastle and Bristol (7.37 a.m. from Bristol and 8.15 a.m. from Newcastle) now has a buffet instead of a restaurant car.

As mentioned in previous reviews of Regional timetable changes, the through York-Swansea and York-Bournemouth trains, *via* Sheffield, Leicester, and Banbury, are being run on Fridays and Saturdays only. The L.M.R. "Pines Express" between Liverpool, Manchester, and Bournemouth *via* Birmingham and Bath continues, however, to run daily with restaurant car throughout.

Scientific Research on Indian Railways

AT a recent meeting of the Indian Science Congress Association held at Poona, Dr. D. R. Malhotra, President of the Engineering & Metallurgy Section of the Association, and Chemical Engineer & Metallurgist, Bombay, Baroda & Central India Railway, presented an address entitled "The Role of Science on Indian Railways." The choice of subject was appropriate, as Dr. Malhotra was the first railwayman to hold this office, and he has had over 20 years' experience of the scientific organisation of Indian railways. Among his opening remarks was the quotation, "the history of civilisation is, in fact, the story of transport," and he pointed out that the national emblem of India, the *chakra*, or wheel, truly signified her greatest industry, the national railways. However, the capacity of this industry still failed to meet the rapidly-growing demand for transport. At this point we would interpose a reminder that the railways provide almost the whole inland transport of the peninsula; the urgent problem, therefore, is to improve their efficiency and acquire more power and rolling stock, and increase line capacity to meet the demand. The address indicates some of the means by which science can assist in this improvement.

In India the railways are the largest buyers and users of material, the principal types of which are discussed in the address. First in importance is coal, about 8½ million tons a year being consumed by them. Scientific investigation has shown that a locomotive burns about one-fifth of its fuel when it is not doing useful work, such as when raising steam, waiting for its trains, and standing in loops and sidings. Of the four-fifths consumed in hauling trains, some 70 per cent. is used for making steam, 26 per cent. is wasted in gases and cinders emitted from the chimney, and four per cent. is lost in ash pits. Furthermore, it is stated that of the 70 per cent. of the coal used for making steam, only 59 per cent. of its heat value goes to the cylinders, the remaining eleven per cent. being lost in radiation, or used for auxiliary purposes. As, however, 52 per cent. of the 59 per cent. in the cylinders is shown to pass out of the blast-pipe in exhaust steam, it follows that seven per cent. only is available to provide power at the drawbar. If such a high ratio of losses is correct, a reduction of them by even one per cent. would result in a saving of 70,000 tons of coal a year in India, valued at about £150,000. It is clear, therefore, that scientific research corroborates the general view that economy in fuel should be pursued to the utmost.

One avenue of approach to this problem is the possible utilisation of the million tons of slack, or fines, lying idle in the Indian coalfields. Briquetting has been tried, but the various suitable binding media have so far proved too costly for general use. Economy might also be effected in another direction. Though only standard grades are specified in ordering locomotive coal, check analyses of consignments generally show inferior quality. Consequently, Dr. Malhotra recommends severe penalties for the coal-owners in such cases, and proper coal-testing centres on the railways to enable the quality to be checked before acceptance.

There are at present some 70 water-softening plants installed on Indian systems, but a much larger number is advocated in the address, as, indeed, was recommended by the Inglis-Appleton Mission's report in 1945. Turning to the economic use of metals on Indian railways, Dr. Malhotra suggests the extensive use of special medium manganese steel for rails. He also refers to the advantages

of long lengths of welded rails and an extension of the policy of creosoting sleepers.

Indian railway workshops deal with about 190,000 tons of pig-iron annually, but there is room for considerable improvement in foundry methods to secure economy in its use. As another example of the value of scientific research, the address shows that the shortage of tin had been responsible for investigations, carried out by the author, resulting in the production of a tin-free alloy substitute. In discussing lightweight rolling stock it is mentioned that a new type of coach 70 ft. long and 11 ft. 8 in. wide has been designed in India to supersede the hitherto standard 60 ft. × 10 ft. vehicle. Its weight, however, is such that average trains of the new stock will, we are told, weigh only 360 tons loaded, as compared with 550 tons of the old. It is not clear whether the comparison is based on equal numbers of vehicles a train, or equal seating capacity, or whether it is made on some other basis.

Other subjects mentioned in the address—either briefly, or in detail—as coming within the scope of scientific research on Indian railways, are lubricating oils, paints and varnishes, the manufacture of locomotives and rolling stock in the country, air-conditioning, and electrification. The standard materials previously supplied by the United Kingdom are now no longer readily available to India, and —to quote the address—" with the departure of some of the experienced technical men, we have been reduced to a somewhat helpless position." The quality of many of the materials that are available appears to be sub-standard, and the development of substitutes would and should, in Dr. Malhotra's view, require a large number of trained Indian scientists. In fact, the latter part of his address is devoted mainly to a plea for the training of many such men, and for improved opportunity and scope for highly-trained and experienced scientific personnel in this key industry of India.

A portrait and biography of Dr. Malhotra appear elsewhere in this issue.

British Railways Standard Coaches

EARLY this year the first passenger coaches built to the new standard design of British Railways began to come from the workshops. The programme for the current year provided for the delivery of 1,189 standard coaches of twelve different types, each with all-steel bodies and capable of working over any of the main-line routes in the country. In our March 16 issue we described and illustrated some of the prinicpal features of these standard coaches. Of the total programme for the year British Railways made provision for the building of 836 vehicles in their own workshops; the remainder were put out on contract to private builders in this country.

A feature of the railway workshop building programme was the distribution of the construction among various railway shops; for example, underframes and bogies are being built at Ashford, Derby, York, and Wolverton, and bodies at Derby, Wolverton, Swindon, Doncaster, York, and Eastleigh. Details of the constructional methods used are the subject of a series of articles, the first of which appears elsewhere in this issue.

Hitherto, steel coaches have not been built in railway shops except by the methods which are now being used by the Railway Executive, and therefore it is not possible to give detailed comparisons as to the difference in time and cost as between the practice now being adopted and that which would have obtained previously if the work had been undertaken with less efficient tooling and jigging. Special provision has been made in the works for dealing with the present programme and for co-ordinating the production of the various centres. The Railway Executive, however, is confident that, with the present known equipment, the times and costs involved in producing this type of design will bear comparison with anything that is being achieved not only in this country, but elsewhere.

The overall design of the vehicles provides a complete surface without rivets, filling, or stopping. Apart from other considerations, this will enable full advantage to be taken of any developments which occur in synthetic paints, and will also help considerably in easing regular cleaning. The design of the bogie incorporated in the stock has been based on three major considerations; apart from achieving good riding characteristics, the initial cost has been kept to a reasonable level, and it is believed that maintenance costs also will be economical.

The interior of the coaches follows much the same design as that in use by the former railway companies, but special attention has been given to the ease with which lavatory equipment can be maintained both at works and at outstations. The production of furniture and fittings to standard designs has been found of considerable assistance in securing output both in the railway workshops and in those of the private contractors. It is believed that a considerable economy will be achieved by this means in saving both manhours and costs.

Worthwhile Statistics

(By a Correspondent)

UNDER this heading an article in *The Railway Gazette* of June 29 summarised certain 1950 statistics of the U.S.A. railways and compared the operating results for the whole system with those for the largest individual company, the Pennsylvania Railroad. The finding was that, save for a slight decrease in train speed, the general performance had improved, while the Pennsylvania, with a very dense traffic, had moved heavy train loads at a speed below the general average. Western railways, like the Santa Fé and Union Pacific, assembled lighter train loads, but moved them faster.

In answer to a number of requests, the Bureau of Railway Economics, Association of American Railroads, issued on July 20 a statement of four more operating averages. The results for all the U.S.A. railways are set out in the table below, with comparative figures for 1949.

U.S.A. RAILWAYS

	1950	1949	Increase per cent. on 1949
Wagon miles per serviceable wagon per day ...	46·5	42·9	8·3
Net ton-miles per wagon per day	911	807	12·8
Percentage " bad order " wagons to all wagons on line	6·3	6·1	3·2
Percentage unserviceable road freight locomotives to total stock	20·0	17·7	13·0

The first three entries in the above table show that wagon stock was worked harder in 1950, with the result that more wagons required repairs. The fourth entry shows that a considerable number of freight locomotives could not stand the strain of last year's pressure for the movement of additional traffic.

The table below gives the same statistics for 1950 for the Pennsylvania, Santa Fe, and Union Pacific railways, all of which earned larger freight revenues than in 1949.

Year 1950	Penn-sylvania	Santa Fe	Union Pacific
Wagon miles per serviceable wagon per day ...	34·4	69·3	82·8
Net ton-miles per wagon per day	661	1,136	1,484
Percentage " bad order " wagons to all wagons on line	15·0	4·5	2·9
Percentage unserviceable road freight locomotives to total stock	24·2	15·2	18·4

Each of the Pennsylvania figures is below the average for U.S.A. railways and for the two Western lines. The slow movement of the Pennsylvania's massive traffic is not economical. Last year its operating ratio of 84·4 per cent. contrasted badly with 74·5 per cent. for all the U.S.A. railways, 67·1 per cent. for the Santa Fe, and 70·3 per cent. for the Union Pacific. With total operating revenues of $930 million, the Pennsylvania had a net railway operating income of $58 million. The corresponding figures for the Santa Fe were $523 million and $81 million. Big trainloads are not enough and mobility pays. The seat of railway prosperity in the States no longer lies in the east. It has gone to the Central Western Region, where the average traffic density has grown to no less than 70 per cent. of the Eastern District density, and is likely to expand still further.

LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of correspondents)

Staff Shortage on British Railways

September 8

SIR,—I read with interest in your September 7 issue the letters from Mr. Broadhurst and Mr. Grigg, both of which display a realistic knowledge of the deficiencies of British Railways at the present time.

Mr. Broadhurst writes of staff shortage and mentions the lack of discipline apparent in these days, and Mr. Grigg goes further by giving details of a serious state of affairs.

Writing as a humble observer of railways it seems to me that some at least of the effects of staff shortage could be eliminated by tightening up discipline and insistence on a good day's work. I have spoken to many inspectors and foremen, and they are extremely disheartened by the sad fact that in the matter of discipline they get no backing from the Executive and therefore they are powerless.

Surely the worthy Chairman of the Executive (who has honoured your columns recently with some very common-sense remarks) and his colleagues realise the full implications of this situation, and I feel we should like to hear his comments on this and also a statement as to the progress which is being made with the promised economies following the wages concessions.

Yours faithfully,
CONSULTING ENGINEER

Customs Examinations Delaying Boat Trains

September 12

SIR,—The reference in your editorials to delays to boat trains due in so large a measure to the existing meticulous examination by British Customs officials cannot be the excuse for the late running of the Swedish-Lloyd boat train from Tilbury Dock Station to St. Pancras.

On Saturday, September 8, the Customs examination was completed by 8.40 a.m. and the scheduled time of departure from Tilbury was 9 a.m., due St. Pancras 9.55 (a generous timing for the mileage involved of some 23 miles). Heavy signalling delays caused the train to reach St. Pancras at 10.45 a.m., and old travellers by this route maintain such delays are by no means unusual. Swedish visitors coming to Britain for the first time express astonishment and make unflattering comparisons with the excellent record of punctuality maintained by the Swedish Railways for much longer journeys.

The new centre corridor stock now forming the boat trains on this service looks cheerful and bright outside. The interior cleaning seemed to be of a perfunctory character and a little evidence of dusting and even polishing, preferably by women cleaners, might have given a more pleasing impression to our Swedish guests. The paper antimacassars used in the train, an innovation I have not previously encountered, are welcome not only to natives but to Swedes, whose standard of cleanliness far exceeds our own.

Yours faithfully,
VIATOR

September 1

SIR,—I was much interested in the comments in your August 31 issue on delays to boat trains through customs examinations and the need for improving handling of Holyhead-Dun Laoghaire traffic.

I have never used the Holyhead-Dun Laoghaire route, but on a number of visits to the Continent have never experienced any delay when passing through Dover or Folkestone. Forty minutes is the usual scheduled interval between the ending of one stage of the journey and the beginning of the next, and I have only known punctiliousness in its being adhered to. When I was passing through Liverpool on my way to and from Dublin the Customs took minutes only.

The impression does grow that perhaps the former L.M.S.R. was less alert than the Southern in arranging for the handling of cross-Channel traffic; maybe a "slum" mentality developed—after all the travellers are not as elegant as some of those who cross to the Continent.

The absence of baggage regulation is a case in point. It is amazing that with two countries in as close a relationship as are the United Kingdom and Ireland the traveller on the "Irish Mail" cannot part with his bags after their being examined by British and Irish customs officers at Euston, and pick them up at Amiens Street. This can be done between Victoria and many parts of Europe. At Basle and Geneva, both in Switzerland, the French Customs work alongside their Swiss colleagues.

Facilities of this kind might do something to ease the strain at Holyhead and Dun Laoghaire.

Yours faithfully,
SEFTON D. TEMKIN

28, Upper Berkeley Street, W.1

Muddled Thinking on Railway Wages

September 10

SIR,—Surely it is not only the editor of *The Railway Review* that is guilty of muddled thinking on matters affecting the present railway staff position.

It seems to be taken for granted by some members of the management that employees of British Railways have dedicated their lives to the service of transport. There may be a few individuals born of a long line of "engine spotters" who are genuine enthusiasts working in their chosen vocation, but this is not so with the majority of the staff recruited between the two wars.

For a long period the railway companies were able to take advantage of widespread unemployment and take their pick in the labour market. In those days it was not a case of choosing employment but of taking any job one could get. Are men recruited in such circumstances to be blamed for seizing the first opportunity of seeking more remunerative work or better conditions? Whilst he draws wages, an employee is in honour bound to give loyal service but a cheap labour concern has no right to expect self-sacrifice.

The present management is in a cleft stick—rising costs and heavy deficits on the one hand, loss of staff (and it is those with spirit who leave) on the other—but it is its problem and it has to be faced that the drift away cannot be stopped, nor recruits attracted, unless the rewards of railway service compare equally with other jobs available.

Yours faithfully,
REALIST

Economics of Long-Distance Electrification

September 9

SIR,—Whilst I agree with most of the observations of Mr. J. C. Read in his letter in your August 24 issue, I am rather astonished at his view that the designs of the equipment used on the Paris-Dijon electrification are far more elaborate than would be considered necessary in this country.

Twenty-six years ago I worked for some time on the early French electrified lines when locomotives of about 1,500 h.p. were used and top speeds were of the order of 55 m.p.h. The equipment used then was largely of British design and was simple but limited in scope.

Comparing the equipment used then on those lines with the equipment now used on the Paris-Dijon section, some elaboration has taken place, but it is my view that there is nothing which would be considered unnecessary if similar electrification schemes were now carried out by British engineers.

I have had an opportunity of studying the latest equip-

ment used on the Dijon section and bearing in mind the service called for—a schedule of 75 m.p.h. over the 190 miles with exceptionally heavy trains—there is no unnecessary elaboration. This service must call for an average h.p. in excess of 3,000, whilst demands well exceeding 4,000 must occur at both the highest speeds and during acceleration. The current required by the locomotives is naturally heavy, calling for heavy overhead equipment.

It may be argued that there is no need for such a service in this country as exists now in France and that we can operate all our passenger services with motor coach trains as on the London Underground and Southern Region lines. I also, like Mr. Read, believe we in this country are substantially in advance in this branch of electric traction, but if it is contemplated operating electric locomotive-hauled trains between, say, London and Glasgow on the West Coast route at a schedule of 75 m.p.h., then we like the French will find that the 1,500 volt d.c. system will be prohibitive in cost and the a.c. high voltage system will have to be considered.

Yours faithfully,

H. CHARNLEY

Brook House, Clayton-le-Woods,
Chorley, Lancs.

British Railways Publicity

September 6

SIR,—Had your correspondent Mr. Ian Colquhoun, writing in your August 31 issue, seen the new British Railways Enquiry Bureau at York, I am convinced that he would not have written to you in protest.

In a city whose every stone breathes history and whose Festival programme re-created with great success a true-to-life mediæval atmosphere, I feel that the British Railways Publicity Department is to be congratulated in its endeavour to publicise the railways without in any way conflicting with that atmosphere.

As Chairman of the Harrogate Publicity Committee I know that a great deal of attention was aroused by the bureau in the Shambles and I have nothing but praise for those responsible for the idea. If an interest in those relics of the past, barons of beef, is evidence of a morbid taste, there must be millions of people in this country today who would plead guilty to such tastes.

Congratulations, British Railways, on an excellent example of means and end amply justified.

Yours faithfully,

DON M. CHRISTELOW

Harrogate

Publications Received

The Microscopy of Plate-Cut Railroad Cross-Ties, an article in *Wood Research* by Robert A. Holcombe, in the series "Improving the Service Life of Railroad Cross-Ties," published by the Timber Engineering Company, Washington, D.C., U.S.A.: 6 pp. 7½ in. × 5½ in., illustrated: June, 1951. The Association of American Railroads and the National Lumber Manufacturers' Association are jointly subscribing to a five-year research programme conducted by the Timber Engineering Company Laboratory with a view to improving the service life of sleepers. This article in the series describing results achieved, gives details of the analytical tests carried out on small blocks cut from a number of sleepers removed after service in various American railways, and damaged by mechanical action causing the bearing plates to cut into them. Various kinds of timber were thus compared in microscopic examination after ballast grit and other extraneous matter had been removed by an acid process. The types of failure observed were (1) crushing, usually accompanied by shifting of the spring wood cells, and mainly in soft wood sleepers; (2) lateral shifting in the springwood cells in oak only; and (3) buckling of the fibres: specimens of each are illustrated. Cell failure under the bearing plate occurs in stratified layers, each new layer forming as the preceding strata are abraded.

B.E.A.M.A. Guide to British Electrodes.—This booklet (No. 144, 1951) has been prepared by the Arc Welding Electrode Section of B.E.A.M.A. to give those interested in the manual application of electric arc welding useful information on general matters relating to the process. The booklet includes a brief description of the British Classification of Electrodes, which has now been published by the British Standards Institution as B.S.1719:1951, and advice on how to use it. A different method of classification has been instituted in the U.S.A. and notes on this classification with comparisons of British and American code numbers are given. Lists of mild-steel electrodes made by member firms are given. Copies, price 2s. each, can be obtained from the British Electrical & Allied Manufacturers Association (Inc.), 36, Kingsway, London, W.C.2.

Plessey Hydraulic Pumps.—A brochure published by the Plessey Co. Ltd. gives constructional and other details of a comprehensive range of hydraulic pumps. This brochure is illustrated and contains assembly diagrams as well as tables of performance curves and power input. Installation instructions are included and also a questionnaire to facilitate ordering.

A Magnetic Sorting Bridge.—Useful information relating to a non-destructive method of testing ferrous samples for variation in chemical composition, heat treatment, hardness, and depth of carburisation is contained in this brochure issued by the General Electric Co. Ltd. The publication contains a circuit diagram and waveforms showing results of a series of tests on engine valve springs and waveforms obtained from metal carburised to various depths. Also included are illustrations of jigs used for locating valve springs during testing.

Engineering Small Tools and Accessories.—A comprehensive catalogue of small tools and accessories for the engineering industry has been issued by Burton, Griffiths & Co. Ltd., which includes pneumatic and electric portable tools, measuring and inspection equipment, broaches, dividing heads and milling machine tables, twist drills, and so on. For easy reference a general and itemised index has been included. A companion booklet relates to machine tools of British, American, and European manufacture for which the firm is the sole distributor in the U.K., and these include bar and chucking automatics, gear cutting machines and grinders, balancing and boring machines indexed for easy reference. Principal dimensions and capacities are included.

Rapier Electric Wharf Winches.—The firm of Ransomes & Rapier Limited has issued an illustrated leaflet dealing with the essential features of several types of portable electric winches. Designed primarily for handling ships' cargo where cranage is not readily available these winches are made in two sizes. The capacity of each is given.

Guide to Threading Dies.—Much useful data relating to Wharco threading dies for rotary and stationary heads, with information on internal and external chasers, are contained in this illustrated booklet published by W. H. A. Robertson & Co. Ltd. Technical data relate to radial and tangential dies and comparisons of the principal British and American and metric screw threads. Also included are tables of helix angles, depths of threads, cutting speeds and conversion tables, together with details of facilities available for recutting and regrinding worn dies.

Developments in Heating Air Conditioning, 1901-1951.—To commemorate its jubilee year a well-illustrated brochure has been brought out by Thermotank Limited which provides an interesting account of the activities of this firm and of developments in air conditioning and heating at home and overseas since 1901. The publication depicts various installations carried out and illustrates the first Thermotank built at Clydebank in 1897. In its early days, this firm concentrated more on the ventilation of ships, whereas later developments also embraced railways and industrial undertakings in general.

THE SCRAP HEAP

Expensive Pickings

A railway labourer admitted at Goshen, Indiana, that he earned £1,000 by picking plants growing along the railway lines. The plants happened to be marijuana and he was charged with being in possession of the drug.—*From the "Daily Express."*

"West Highland" China

In Crianlarich Station refreshment room there is a relic perhaps rarer than the South Eastern milk jug referred to in our September 7 issue. It is a blue decorated china sugar basin inscribed "West Highland Railway, return to Crianlarich Refreshment Rooms" in fine lettering. A correspondent also draws our attention to the excellent G.N.S.R. soup plates in Elgin Station refreshment room, which "made my 'clear' just like nectar."

Last Journey

A correspondent writes that 14 passengers turned up for the last journey of the one-coach train which has been running for 39 years on the Dearne Valley line between Edlington, near Doncaster, and Wakefield—more than had used it for years. As none of the halts on the line have platforms, the coach was equipped with steps automatically operated by vacuum. In the early days, the locals gave this train the name of the "Titanic." An unusual feature of the closing to passenger traffic of this 22-mile line was the filming of the start of the train on its last journey. The film is to be kept in Doncaster Art Gallery.

Stamp for Parcels Traffic

New stamps have been issued by the Western Australian Government Railways Commission for use in connection with parcels traffic by rail. Printed

in four colours, these stamps have a light-blue background with the value and the name of the system in red, while in a lower panel, printed in olive green, there is a photographic reproduction either of a steam locomotive, or a diesel-electric railcar, or a semi-trailer passenger bus. The name of the issuing station is printed in black at the bottom of the stamp and their values range through a series of 13 denominations from ½d. to 10s. They replace the former one-colour stamps and were first brought into use in Western Australia in August.

S.A.R. Service

Many bricks are thrown at the railways in the ordinary course of events, but occasionally the word of praise comes along to stiffen morale. For instance, a Fish Hoek correspondent has gone out of his way to "thank the railway administration for delightful new fast services between Cape Town and Fish Hoek."

An exporter of asbestos products has expressed appreciation of the steps taken by the railways to get his product to the ports at a time when normal railway services were somewhat restricted as the result of the "go slow" strike by the artisans. A factory in Port Elizabeth received raw material supplies from a ship which could not come into port owing to adverse weather conditions; the railway administration sent a tug and lighter to the ship lying in the roadstead.—*From "South African Railway News."*

Train Types

THE MAN I LOVE

What a pity dear old Gilbert's dead and gone!
(I mean, of course, the celebrated one
Who gave us news of Ko-Ko's little list
Of miscreants who never would be missed).

You remember all the specimens he found
Of offenders who'd be better underground,
Well, if Gilbert lived today, he'd be surprised
And I'm sure his list would have to be revised.

His tale of victims, brought right up-to-date,
Would include, I'm very much inclined to state,
Certain travellers in our suburban trains,
Whose manners seem as scanty as their brains.

And, if I had aught to do with Gilbert's choice,
It would make my poor but honest heart rejoice
(In fact t'would be a pleasure
I would treasure beyond measure)
To mark down for lingering torture's fond embrace
That insensate barbarian,
That insolent vulgarian,
That inhumanitarian,
That extra-or-di-nary man
Who puffs his cigarette smoke in my face.

A. B.

British Engineer Honoured in France

The unveiling last April at Barentin, Normandy, of a statue of Joseph Locke, the famous British engineer. In the background is Barentin Viaduct on the Paris—Le Havre line, of which he was the engineer

Photo] ["Paris-Normandie"

OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

AUSTRALIA

Diesels for Commonwealth Railways

The first main-line diesel-electric locomotive built in Australia has been tested between Sydney and Penrith on the New South Wales Railways. The locomotive is the first of many being built by the Clyde Engineering Co. Pty. Ltd., in association with General Motors Corporation of the U.S.A. which is supplying the power equipment, transmission and controls. The mechanical and electrical installation is being carried out entirely by the Clyde Company. Eventually only the diesel motor and generator will be imported from the U.S.A.

The new locomotives will be used on the Trans-Continental Railway of the Commonwealth between Port Augusta and Kalgoorlie. Their efficiency will enable eleven locomotives to replace 47 steam locomotives. The first of the new locomotives was completed in only 108 working days after the initial drawings had been completed. Subsequent locomotives will be delivered at short intervals.

SOUTH AFRICA

The "Blue Train" Reintroduced

The "Blue Train" was reintroduced from Johannesburg on August 23. Since August 27 the full "Blue Train" service once a week between Johannesburg and Cape Town in each direction has operated.

New Johannesburg Station

On September 13 the Minister of Finance officially opened the new station platforms at Johannesburg.

Extension of Reef Electrification

A further extension of the Reef electrified lines was completed on August 3 with the inauguration of electric traction on the lines from Midway and from Randfontein to Bank and Welverdiend. The Rand network is now electrified from Wattles (east of Germiston) in the east to Welverdiend in the west, and to Pretoria, and from Germiston to Springs and Welgedacht. The new extension covers 57 route-miles and has cost some £750,000.

UNITED STATES

Locomotive and Wagon Situation

During the first six months of 1951, Class I railways placed in service 1,309 new locomotives, of which 1,299 were diesel, eight steam and two electric. On July 1, 1951, there were 1,674 locomotives on order for those systems, 1,658 being diesels (2,233 units), 14 steam, and two electric (four units). These figures are reported officially by the Association of American Railroads. During the month of June, 9,041 wagons were placed in traffic and 3,415 were withdrawn from service, so that there was an increase in the wagons available of 5,625, the highest monthly increase since April, 1942. In the twelve months ended July 1, 1951, the number of serviceable wagons available rose by 40,000; the supply of box cars is now considered "adequate to meet current demands," though there are still shortages of flat, well, and covered hopper wagons. Meanwhile coal production during 1951 was expected to total about 525,000,000 short tons.

CANADA

Freight Rate Increase

The Board of Transport Commissioners has authorised a freight rate increase of between 4 and 5 per cent. on some rail traffic between Canada and the United States and some export-import traffic through Canadian ports. The order is in line with an increase granted to the U.S.A. railways last month. The Canadian increase will be 5 per cent. in the East and 4 per cent. in the West.

CHILE

New Andean Tunnel Proposed

There are at present three railways connecting with Argentina across the Andes. The northernmost is the connection between Antofagasta and Salta. Further south are the oldest railway, over the Andes, between Los Andes and Mendoza, and, finally, the newest, affording communication between Concepción and Bahia Blanca.

The Los Andes-Mendoza line has always given rise to difficulties. A long section was destroyed in the disaster of January 11, 1934, when the waters of an underground lake were suddenly released. It is now proposed to carry out an extensive reconstruction, including the construction of a new 13-mile tunnel and to reconstruct the whole line, partly metre-gauge, to 5 ft. 6 in. gauge and to double the track on the connecting line between Valparaiso and Santiago in Chile.

SWITZERLAND

Neuchâtel-Lausanne Doubling

The completion of the double track between Auvernier, just south of Neuchâtel, and Boudry, another three miles further south, is to be followed by the extension of the second track to Bevaix, 2¼ miles from Boudry. The project, entailing an expenditure of fr. 2,770,000, has been approved, and is to be put in hand shortly.

Reconstruction of Buchs Station

A long-mooted scheme for the reconstruction and enlargement of the frontier station of Buchs, on the Zurich-Innsbruck main line, has been again under consideration in view of the congestion caused by the increasing goods traffic. The scheme envisages important extensions to the goods and marshalling yards, including the adoption of hump shunting. As to the passenger traffic, the absence of platforms has long been a great disadvantage. This is to be remedied by the construction of covered platforms connected by subways. A customs inspection hall is also to be built.

One of the greatest obstacles to the realisation of the project is the financial contribution payable by both the Austrian Federal Railways and the Austrian Customs as joint users of the station. The share of the Austrian Federal Railways in the reconstruction expenditure would amount to 30 per cent. To enable the work to be put in hand without further delay, however, it is proposed to grant the Austrian Federal Railways a long-term credit for the sum involved.

Some forwarding houses, whose frontier offices at Buchs are handicapped by the lack of space and other facilities have been pressing in recent months for reconstruction to be carried out. On the other hand, certain interests favour the transfer of the Austrian customs services from Buchs to Feldkirch, in Austria, 11¼ miles from Buchs, with consequent removal of a number of forwarding houses from Buchs.

Buchs, close to the Swiss frontier with Liechtenstein, is 67 miles from Zurich, though the main line from Zurich joins the Coire-Rorschach main line, on which Buchs is situated, at Sargans, about 10 miles south of Buchs. On the same line, 23½ miles north of Buchs is St. Margrethen, in Swiss territory, the only other railway frontier station between Switzerland and Austria.

FRANCE

Currency Exchange at Stations

As a facility for foreign visitors, offices for the exchange of travellers' cheques and foreign currency are open throughout the year at many stations, including Paris, Bayonne, Bordeaux St. Jean, Cannes, Charleville, Cherbourg, Colmar, Dieppe, Epernay, Grenoble, Lille, Limoges, Lyons Perrache, Marseilles St. Charles, Metz, Le Mont-Dore, Mulhouse, Nancy, Nice, Rheims, Strasbourg, Toulouse, Tours, and Vittel. Similar offices are open during the tourist season only at Aix-les-Bains, Chamonix, Dinard, Evian-les-Bains, St. Gervais-Le Fayet, St. Malo, Trouville-Deauville, and Vichy.

WESTERN GERMANY

Use of Concrete Sleepers

A chief officer of the Purchasing Department of the Federal Railways, Dr. Meier, reviewing the use of concrete sleepers on the Federal Railways, states that on the basis of detailed cost surveys it has been found that the concrete

sleeper if mass-produced is more economic than the wooden. Experience with concrete sleeper types at present in production confirms theoretical strength calculations. Sleepers are pre-stressed in accordance with Dr. Karig's method; the pre-stressing force is imparted after the concrete has hardened over a period of three months. The advantages of this particular method are said to be: simplicity in production; economical production of high-quality concrete; the possibility of subsequent stress adjustment to compensate for shrinkage; good electrical insulation; small capital investment in workshop equipment with high production efficiency; and no import of materials from abroad. There is therefore every reason to believe, states Dr. Meier, that the concrete sleeper has come to stay on the Federal Railways.

Difficulties with DB-Goods Wagons

The Federal Railways are at present replacing the former "DR" ownership indication on goods wagons (Deutsche Reichsbahn) by the new abbreviation "DB" (Deutsche Bundesbahn—German Federal Railways). In recent months, however, the railways in the Soviet Zone have refused stock marked "DB" despite the wagon exchange agreement concluded between the two systems. According to a recent announcement of the Federal Railways it is feared that persistence in this refusal may lead to a shortage of rolling stock available for consignments addressed to the Soviet Zone and to Berlin.

EASTERN GERMANY

Detour of Berlin

The (Eastern German) State Railways have announced further plans for avoiding running through the British, American, and French sectors of Berlin. The 14-mile double-track avoiding line which was completed recently is to be extended; the project includes a series of flyovers for traffic between the east, north, and south, and also the construction of an extensive marshalling yard.

These plans, due for completion by October 1, aim at making East Berlin the centre of the Eastern German railway system. Marshalling yards situated in West Berlin, which are under Eastern German control, are to be dismantled.

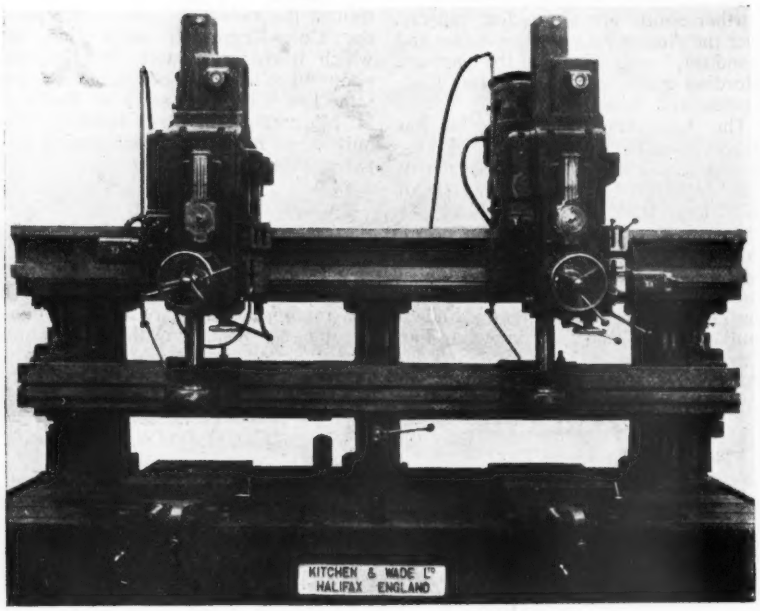
DENMARK

Traction Committee Established

At the instance of the State Railways, the Danish Academy for Technical Sciences has set up a Traction Committee to investigate the technical, economic and social problems connected with a complete or partial change in railway motive power. The members include prominent officials of the State Railways, as well as experts from outside, including Professor P. H. Bendtsen, whose recent plea for railway electrification in Denmark has received much publicity. The chairman of the Committee is Professor J. L. Mansa. The headquarters of the Committee are at Copenhagen Technical University.

Duplex-Headed Vertical Boring Machine

Trepanning two-spindle borer of great rigidity for locomotive rod drilling and boring



A RECENT addition to the range of machine tools produced by Kitchen & Wade Limited, Halifax, is the L.4. Type Duplex locomotive connecting and coupling rod borer. The machine consists of a one-piece casting forming the bed of the machine on to which is mounted three uprights which carry the main cross-rail and drilling and boring heads.

Also mounted on these uprights is a secondary one-piece cross-rail casting which carries the spindle steady brackets, the whole forming a box girder construction of great rigidity. The provision of the steadying brackets also prevent vibration when the machine is used on heavy-duty work; the box bed is also provided with tee slots for securing the two work tables 22 in. × 22 in., which are provided with compound adjustment.

Machine Capacity

The machine is capable of drilling 3 in. dia. holes from solid, and trepanning up to 20 in. by using the steadying brackets for supporting the spindle. The drilling heads have a transverse travel on the cross-rail up to a maximum of 12 ft.; a vernier, fitted to the cross-rail, is used for setting the spindle steady brackets to the correct centres of holes to be bored in the rods, a considerable advantage where large quantities of rods with similar centres of holes are being handled. Full-length trip motion is provided to enable maximum longitudinal travel of the boring spindles to be covered in one setting. Controls are centralised on the lower part of the saddle.

The boring heads, which can be used as a pair or as single units, are driven by a 10-h.p. motor—mounted near the top of each column—through hardened chrome gears; 30 spindle speeds are provided, 800 to 8·5 r.p.m., with 9 spindle feeds of 36 to 150 cuts per in. A multiple-plate friction clutch controls the spindle in both forward and reverse directions. The overall height of the machine is 10 ft. 9 in., and the approximate weight 10 tons.

Locomotives for Victorian Government Railways

Main-line "R" class passenger engines built to the 5 ft. 3 in. gauge, designed for conversion to standard gauge

NOW under construction at the Hyde Park Works of the North British Locomotive Co. Ltd. are 70 "R" class, 4-6-4 type passenger engines for the Victorian Government Railways. The locomotives are to the design and requirements of Mr. A. C. Ahlston, Chief Mechanical Engineer. A feature of the design is that though the engines are being built for the 5 ft. 3 in. gauge, they may easily be converted to standard-gauge should this be necessary later.

For this purpose distance pieces have been provided for the frame faces of the cylinders, slidebar brackets, and so on; the engine frames will remain unchanged. Inspection during construction at the makers' works is being carried out by A. E. Turner & John Coates & Co. Ltd.

Boiler Design

The boiler barrel, with external diameters, at front and rear, of 5 ft. 7½ in. and 6 ft. respectively, consists of three rings with the middle ring tapered. The longitudinal seams are treble riveted, with inside and outside butt strips and the circumferential seams double riveted. The distance between the tubeplates is 16 ft. There are 30 superheater flue tubes of 5¼ in. outside dia. and a total of 155 small tubes of 2 in. outside dia.

The smokebox tubeplate is stayed above the tubes by braces to the first barrel ring, and is attached to the boiler by solid rolled angle ring. The outer firebox back plate is supported by longitudinal stays fixed to the third barrel ring; adequate washout facilities are provided.

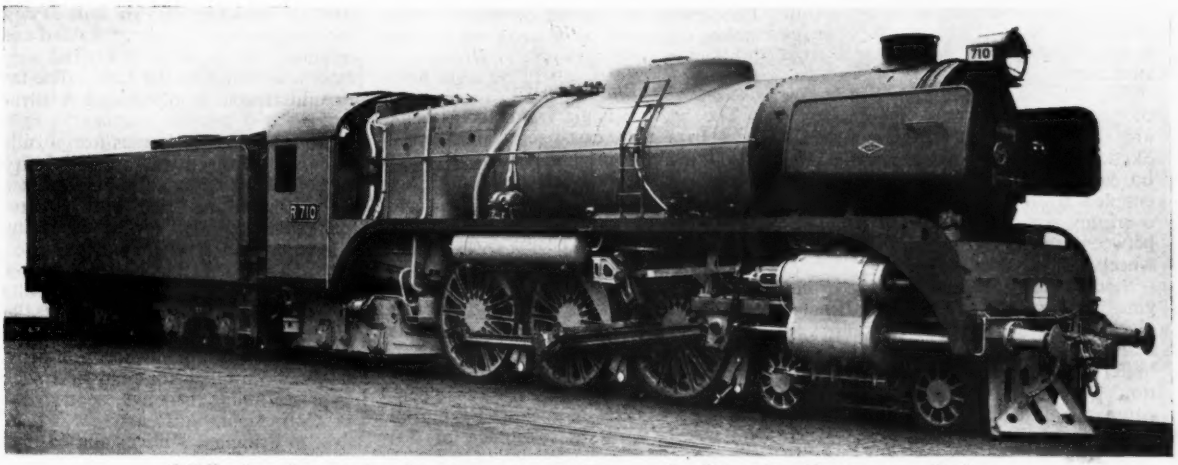
The firebox is of the Belpaire type with an inner steel box of all-welded construction, with long combustion chamber; two Nicholson thermic syphons support the brick arch. Roof stays are of Longstrand steel, with flexible stays in the breaking zones and combustion chamber. The boiler is supported at the front of the firebox by expansion shoes attached to the foundation ring, bearing on slides fixed to the front end of the frame cradle casting.

Frame deflection plates are located at the front of each of the coupled wheels to reduce bending stresses in the frames. A breathing plate is fitted between the foundation ring and the hind end of the cradle casting.

The cylindrical smokebox is self-cleaning and the smokebox floor is cemented with a mixture of cement, coke, and sand. The chimney is of cast iron with a cast-iron extension and a double mild steel petticoat; a spark arrester is fitted. Deflection plates are fitted on each side of the smokebox.

The regulator valve is of the balanced type and is fitted with a pilot valve. Two tangential steam driers are provided in the dome and steam is supplied through a 7 in. dia. internal steam pipe to the 30 element Melesco superheater.

The Standard Stoker Company's type MB-1 stoker unit is fitted and delivers coal under the firebox to the firing table located in the centre rear of the box. The engine is mounted under the floor



"R" class locomotive for passenger services on the Victorian Government Railways

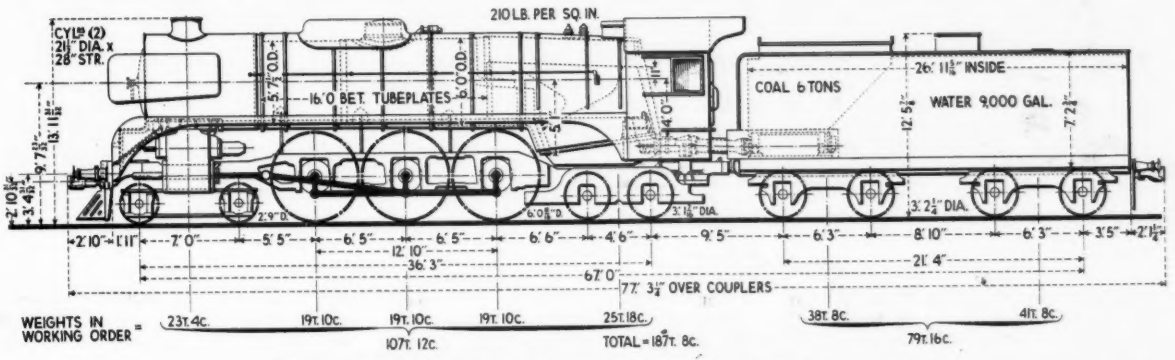


Diagram of principal weights and dimensions of the locomotive

of the cab and drives the feed screw in the trough through universal shafts and gearbox attached to the rear of the trough; the control mechanism is mounted in the cab.

A hand-operated Waugh-type fire grate is arranged for rocking and dumping in two sections with fixed sections on each side of the stoker firing table. The ashpan is of all-welded construction, with double hopper doors; ashpan drenching is provided. Sliding doors are fitted to each hopper, operated by means of an air cylinder. An air-operated Franklin firedoor is fitted and this is actuated by a foot treadle fitted in the cab.

The boiler barrel and throat plate are lagged with asbestos mattresses, and the firebox is lagged by means of asbestos sprayed on the inner surface of the clothing; the cylinders are lagged with magnesia cement. General steam fittings include two Nathan type 1918, non-lifting injectors, two Coale safety valves, two blow-off cocks, and two sets of water gauges with Klinger type glasses and pressure gauges.

Particulars of Engine

The main frames are of bar type, cut from rolled slab and finished to a thickness of 5 in. A cast-steel headstock incorporating a buffer beam is fitted at the front end, and the back end of the frame consists of a one-piece steel casting attached to the main frames at the rear of the coupled wheels; ample frame staying is provided by cast-steel cross stretchers.

The axlebox guides and wedges are of phoshor-bronze and the horn clips are of cast steel. Grease lubricated Skefko self-aligning roller bearing axleboxes are fitted to all coupled axles. The coupled laminated bearing springs are overhung and compensation is arranged between the driving and trailing coupled wheels.

Side buffers are fitted at front of engine and rear of tender, and distance pieces are provided under the buffers to maintain the proper relation between buffers and couplers during the transition period. An automatic Alliance coupler is fitted into a pocket casting on the front engine headstock; a transition screw coupling is also provided. A drawbar and safety drawbar are fitted between engine and tender together with an intermediate buffer of the wedge type. The rear of the tender is equipped with an Alliance coupler, transition screw coupling, and Spencer Moulton drawgear.

The cast-steel wheel centres are of SCOA-P type; the revolving masses only are balanced. The tyres are to the railways standard profile, secured in position by tyre retaining rings. Crank pins and coupling rod pins are forged from 3 per cent. nickel steel, machined and hardened.

The cast-steel cylinders incorporate a smokebox saddle, and are fitted with cast-iron liners; the cylinder and steam chest covers are of cast iron. Release cocks are fitted and are actuated by an air cylinder from a control valve in the cab; by-pass valves have also been fitted.

Walschaerts valve gear actuates 11 in. dia. piston valves which have a maximum travel of 6½ in. and cut-off at 75 per cent. in full forward gear; hand reversing gear is fitted on the left-hand side of the engine. The connecting and coupling rods are forged from manganese molybdenum steel and are of fluted section. Adjustable brasses are fitted to the connecting rods; the coupling rod bushes are of the solid type, lined with white metal.

The piston consists of 3½ per cent. nickel-steel forged centre with cast-iron bull ring riveted to the piston and fitted with two cast-iron piston rings. The piston is secured by a gunmetal nut and split cotter, and the crosshead by means of a tapered cotter fitted with a split safety cotter; the piston rod and valve spindle packing are of the King type.

Lubrication of valves and pistons is by a Nathan six-feed type DV2 mechanical lubricator, driven from the valve gear. All feeds are controlled by terminal checks, and atomisers are provided for the feeds to the steam pipes and cylinders; a manifold is fitted for this purpose. Lubrication of the engine bogie centre, trailing truck pivot and coupled wheel axlebox horn faces is by a Nathan six-feed lubricator driven in a similar manner to that for cylinder lubrication. Distributors are provided for lubrication to the axlebox guides. Lubrication of the air-compressor and stoker engine is by a two-feed Detroit lubricator.

Bogie Design

The leading bogie frame consists of steel bars with cast-steel transom and end bars cast integral with the outer horns. The inner cast-steel horns are joined transversely by steel frame stays; hardened steel liners are fitted to the horn faces. Spring beams carrying the laminated bearing springs rest on top of the axleboxes and the bogie load is transmitted to the springs through spring seats attached to the underside of the side frame bars.

Grease lubricated Skefko roller-bearing axleboxes are fitted. The bogie control gear consists of rockers having an initial and constant resistance of 33⅓ per cent. The bogie centre is fitted with gunmetal liners.

The trailing bogie is of the four-wheeled Delta type, with all-welded frame. The axlebox guides are of cast steel and are fitted with hardened steel liners. Laminated bearing springs are fitted and spring gear is self-contained and compensated between the bogie wheel springs. A cast-steel pivot is attached to the top of the leading end of the frame; a phosphor-bronze lubricated liner is fitted between the wearing surfaces. The axles are fitted with grease lubricated Skefko roller-bearing axleboxes. The centring device consists of rockers having a constant resistance of 20 per cent.

The cab is of riveted construction with a ventilator in the roof; further ventilation is provided through the cab windows. Staff exchange apparatus is fitted, and a Flaman type E3 speed recorder is provided driven by a gearbox and universal shafts from an arm studded to the back end of the left-hand coupling rod.

Westinghouse A-6-ET brake equipment is provided and includes a 10 in. × 10⅝ in. type KL single-stage air-compressor, an 8D governor, and an 8 in. air strainer. Two 13 in. dia. cylinders actuate brake blocks on the front of all coupled wheels. The hind bogie is fitted with two 8 in. short stroke brake cylinders, mounted on each side frame which operate brake blocks at the back of the wheels.

The tender is fitted with Westinghouse automatic hydrostatically controlled variable-load brake equipment, and two 10 in. dia. cylinders operate clasp brakes on all tender wheels.

Cast-iron sandboxes deliver sand to the front of the leading coupled wheels and are fitted with air-operated sand-traps controlled by a valve in the cab. Pyle National electric lighting equipment is provided and includes headlight with focusing device, two marker lamps on the smokebox front, two marker lamps and one back-up lamp on the back of the tender; cab and gauge lamps are provided.

Tender Design

The tender of the double four-wheeled bogie type has capacities of 9,000 gal. of water and six tons of coal. The tank and bunker is of welded construction, but angles for stays and washplates are riveted to the tank. The tender underframe is of welded construction.

The tender bogie frames are of mild-steel plate, flanged and welded into a box section. The axlebox guides are of cast steel and are fitted with hardened steel liners. Laminated bearing springs with equalising beams are fitted above each axlebox. A cast-steel bolster and bogie control are fitted and control is by swing links and trunnions. Mild-steel case-hardened rubbing plates are fitted to the wearing surfaces and provision has been made for mild-steel packing pieces under the bogie centre.

Principal Dimensions

The leading particulars are as follow:—

Cylinders, dia. and stroke ...	21½ in. × 28 in.
Wheels, coupled, dia. ...	6 ft. 0⅛ in.
,, leading bogie, dia. ...	2 ft. 9 in.
,, trailing bogie, dia. ...	3 ft. 1⅞ in.
,, tender bogie, dia. ...	3 ft. 2½ in.
Wheelbase, coupled	12 ft. 10 in.
,, engine	36 ft. 3 in.
,, engine and tender ...	67 ft.
Height, rail level to boiler centre ...	9 ft. 7⅜ in.
,, ,, ,, top of chimney	13 ft. 11⅛ in.
Heating surfaces—	
Tubes	1,958 sq. ft.
Firebox, including syphons ...	285 ,,
Total evaporative	2,243 ,,
Superheater	462 ,,
Total	2,705 ,,
Grate area	42 ,,
Boiler pressure	210 lb. per sq. in.
Weight of engine in working order	107 tons 12 cwt.
,, tender ,, ,,	79 tons 16 cwt.
,, engine and tender in working order	187 tons 8 cwt.
Adhesive weight	58 tons 10 cwt.
Adhesive factor at 85 per cent. boiler pressure	4·04
Tractive effort at 85 per cent. boiler pressure and 72 in dia. wheel ...	32,080 lb.

A New Type of Bridge Superstructure

Low initial and recurring costs are important advantages claimed

One of the girders being hauled off a lorry; note the inclined semi-circular connector bars welded in two rows to the top flange

A NEW highway bridge has been built over the Snoqualmie River at North Bend near Seattle in Washington State, U.S.A. For the design adopted for the superstructure of this bridge advantages claimed include low constructional cost due to the light weight of the steel required, ease of transport, simplicity in erection and absence of cross bracings, high torsional rigidity, economy in unkeep, and minimum exposure to corrosion.

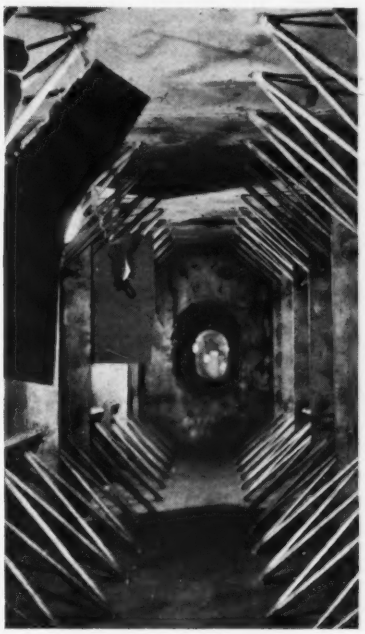
The bridge has a span of 110 ft. and carries a 22-ft. carriageway and two 2-ft. footpaths; it is designed to American H.15-44 standard, suitable for feeders to main arterial highways. The design might be economical for railway road overbridges in certain cases, or even be adopted for underbridges as suggested in an editorial note in this issue.

Principal Features

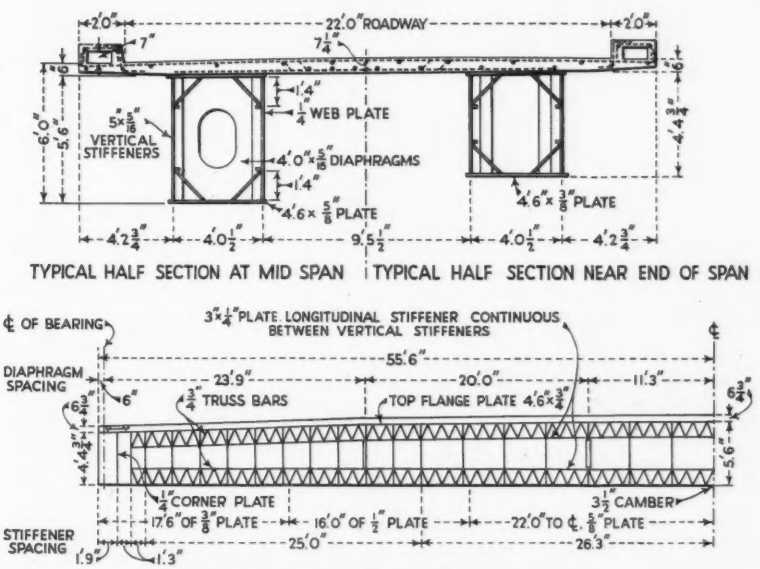
The principal features in the design of the bridge are two light steel box-type main girders composed of ¼-in. web plates and flanges varying in thickness from ⅜ in. to ⅝ in., fabricated by continuous welding. The boxes so formed have flat unbroken external surfaces, as all stiffeners and a special type of diagonal truss bracing are inside them. Each girder is 4 ft. 0½ in. wide between centres of web plates, and its depth varies from 4 ft. 4¾ in. at the ends to 5 ft. 6 in. at the centre, the top flange having a little over 1 ft. of longitudinal camber; it is a hermetically-sealed box with sealed manholes at the ends.

In addition to the normal type of vertical stiffeners, there are four diagonal corner truss bracings in the form of continuous W-trusses, and also four longitudinal stiffening plates welded along the web at the points where the diagonal truss bars join the web. These plates are 3 in. × ¼ in. and the diagonal trusses are ¾-in. bars. There are also ⅝-in. diaphragms fitting the box and spaced about 22 ft. apart along its length.

Along the top flange plate twin rows of 2 in. × ¼ in. flat connector bars, semi-circular in shape, are welded to it; they are inclined at an angle of 30 deg. to the flange and are spaced 3 ft. 9 in. apart longitudinally. One end of each



Interior of box girder showing diagonal corner trusses, vertical and horizontal stiffeners, and diaphragms



Details of box girders. All shop connections are welded and the method of securing rigidity is shown

Box-girder span of 110 *ft. over Snoqualmie River, North Bend, Washington State, carrying a* 22 *ft. carriageway*

connector bar is welded above the web plate and the other above the inner end of each row of diagonal truss bars. These connectors bond the girder with the concrete deck, and rigidly fix the tops of the diagonal bracing trusses relative to the decking. As there is negligible deflection in the part of the concrete slab over the box, and therefore between the webs, the lower junction points between the truss bars and the longitudinal stiffeners and web plates may also be considered as rigidly fixed. The trusses act additionally in conjunction with the webs and stiffeners as triangular systems spanning from one diaphragm to the next. The only unbraced portion of each web plate is, therefore, the small central space between the upper and lower longitudinal stiffeners. The trusses also act as stiffeners and bracings to the lower flange plate.

This system of internal bracing and stiffening ensures a remarkably stiff girder even with the light plates used, and the fact that all the material is as far as possible from the longitudinal axis makes for maximum torsional rigidity also. For these reasons no cross-bracing between the two girders is necessary, apart from the reinforced concrete deck, which has a maximum thickness of only 7¼ in.

As a result of this design, each 110-ft. girder weighs only fractionally over 16 tons, and, apart from the decking—which itself is light—the complete superstructure weighs only 32¼ tons. Because of their light weight and 4-ft. width the girders are easily transported, stacked and erected, as the lower flange is horizontal. With the welded box girders hermetically sealed, no internal maintenance should be necessary and corrosion is reduced to a minimum.

Inspection of the interior is facilitated by the manholes and apertures in the diaphragms. Externally, the flat plates, unbroken by such excrescences as stiffeners and wide flanges, are easily and quickly cleaned and painted. For this information and for the illustrations reproduced we are indebted to our contemporary *Engineering News-Record.*

NEW LIMIT ON SIZE OF ROAD LOADS.—The number of very large loads such as transformers and boilers transported by road has increased considerably since the war, and the number of roads and bridges over which such traffic can pass is limited. The Minister of Transport has therefore made an Order under which loads exceeding 150 tons gross or 20 ft. in overall width, including the carrying vehicle or vehicles, cannot be moved on roads without special authorisation. The new Order is the Motor Vehicles (Authorisation of Special Types) Order, 1951, copies of which can be obtained from H.M. Stationery Office.

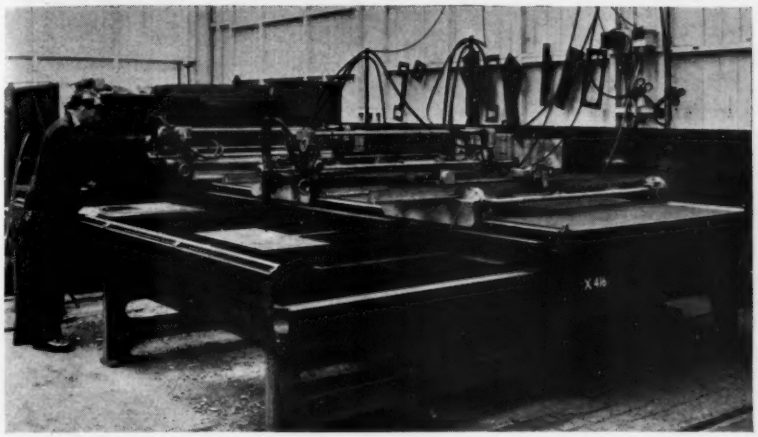
MERGER OF MANAGEMENT INSTITUTES.—The Institute of Industrial Administration has been merged with the British Institute of Management. Membership of the B.I.M. is not intended to constitute a professional qualification and the I.I.A. has therefore been incorporated as a general management professional institute within the framework of the B.I.M. Thus the I.I.A. in effect becomes the professional wing of the B.I.M. It will be recalled that the Institute of Industrial Administration was founded in 1920 with the general aim of developing the science and technique of industrial administration, while the British Institute of Management was established in 1947 on the advice of a committee of industrialists headed by Sir Clive Baillieu, then President of the Federation of British Industries. The many centres and groups of the I.I.A. throughout the country will remain intact.

FILMS ON TRANSPORT.—Among the films produced by the British Transport Films Section in the department of the Chief Public Relations & Publicity Officer of the British Transport Commission are "Transport," "Inland Waterways," "Work in Progress," and "This Year—London." The first-named is concerned with the development and evolution of transport in this country; the second describes the canal activities of the Docks & Inland Waterways Executive; "Work in Progress" depicts work on the new Woodhead Tunnel, marshalling at Whitemoor, and radar in a British Railways Channel steamer, besides activities of the Road Haulage and Road Passenger Executives; and "This Year—London" describes a staff outing to London. The B.T.C. film library includes films produced in the past on transport in Britain, and new productions of the Films Section, available in the 16 mm. size, and most of them in 35 mm., for free loan to educational and similar organisations on application to the Films Officer, British Transport Films, 25, Savile Row, London, W.1.

HULL-NEW HOLLAND FERRY.—The Humber Conservancy Board announces that experimental dredging, designed to cut through a shoal in the Humber, is to be carried out in co-operation with the Railway and Docks & Inland Waterways Executives in an attempt to solve the navigational problems of the British Railways ferry service between Hull Corporation Pier and New Holland. For some weeks the service has been disorganised at low tide because of silting up of the channel.

Construction of British Railways Standard Coaches—1

Application of methods ensuring economic output combined with efficiency



Double-headed Hancock oxygen cutting machine used for profile cutting of underframe and bogie details

THE nationalisation of British Railways made it possible to design standard rolling stock to cover the whole system and thus benefit from the advantages of common designs and works practices. The standardisation of coaching stock belonging to the former main-line companies had been carried out after the amalgamation of the railways in 1923. British Railways, which own over 1,000,000 wagons and some 58,000 coaching stock vehicles, have widened the field of application. It was necessary to consider the general design of coaching stock to be adopted as a standard, and to obtain the best design possible various committees were set up.

It was decided to concentrate on an all-steel passenger coach with a view to securing additional strength and greater safety, compared with a conventional coach of composite design, and resistance to end loading has been increased from 100 to 200 tons for approximately the same weight of underframe. Other resultant advantages over former designs are the provision of an additional 1½ in. width inside the body, due to the thinner bodyside framing required when working in steel, and the adoption of a uniform fully-curved bodyside profile which provided maximum width at shoulder height for seated passengers and those passing along the corridors.

Rolling Stock Programme

British Railways rolling stock programme during the current year includes the provision of 1,189 standard coaches, and these were described and illustrated in our March 16 issue. Of the 1,189 standard coaches required, British Railways workshops will build 836, and contracts for the remainder have been placed with manufacturers in this country. The principal feature of the design of these coaches are: the widest possible route availability; the use of a standard body structure; underframes and bogies common to the 12 standard types; and an underframe designed for a buffing load of 200 tons.

The degree of standardisation achieved in the design of the standard coaches should ensure economic construction and a reduction in the number of components required to be held in store for maintenance. The work of construction has been distributed to the various railway shops; underframes and bogies are being built at Ashford, Derby, York, and Wolverton, while bodies are being built at Derby, Wolverton, Swindon, Doncaster, York, and Eastleigh.

The building programme has been distributed as follows:—

York	116
Swindon	60
Doncaster	65
Derby	325
Eastleigh	140
Wolverton	130

The apportioning of the building programme to the several railway workshops ensures the best use of available capacity and should contribute to economy and efficient production. Individual workshops in certain instances are being used as supply departments, as not only do they cater for their own requirements, in so far as component

Jig bolted to manipulator for welding headstock assemblies

parts are concerned, but, where economical production is assured, manufacture similar components for other workshops.

This arrangement enables quantity production of various components to be achieved at considerably less capital expenditure than would be the case if individual workshops were responsible for their own requirements based on their allotted building programme. Duplication of expensive equipment, press tools, jigs and fixtures, and so on, is avoided. An additional feature is that by this method of component manufacture, batch production is possible without the breaking down of machines already set up, which would be the case if a smaller quantity were required.

Underframe and Bogie Manufacture

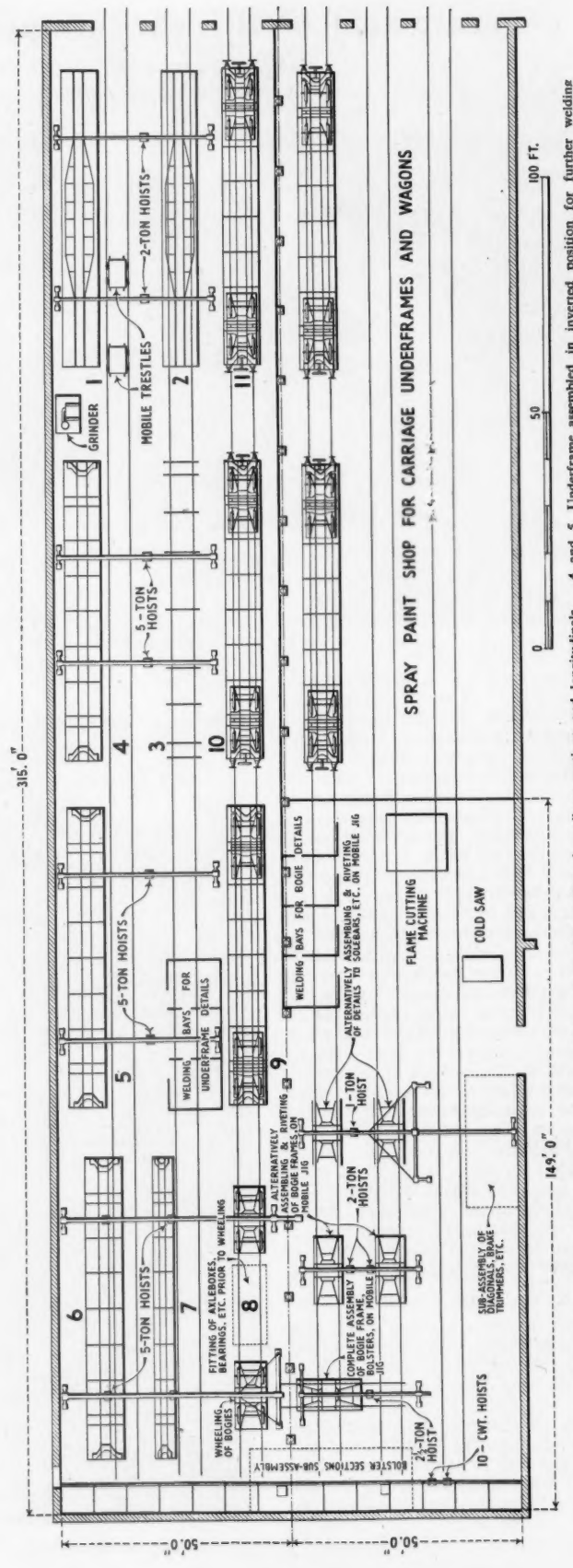
The construction of bogies and underframes is carried out on a progressive system; that adopted at Ashford is shown in the diagram on this page. From the receipts of raw materials, the best possible use is made of jigs and fixtures; bogie and underframe construction is carried out simultaneously. The underframe has been designed with the object of concentrating buffer loads in the central longitudinals, which have been reinforced accordingly; the solebars are subsidiary members of relatively light section supported on cantilevers springing from the longitudinals. The rolled-steel sections for the underframes are first cut to length by flame cutting or cold saws. The work is carried out in jigs to avoid unnecessary machining.

The longitudinals and cantilever sections are tack welded, after which they pass to the first assembly stage. This consists of the building up of the underframe framing, which process is carried out on two jigs on which assembly and welding take place alternately; tack welding only is carried out at this stage. The semi-completed frame is then transferred to final assembly jigs, where the prefabricated headstocks are fitted in the inverted position and further welding is carried out. The method of construction and the fixtures used ensure complete alignment, longitudinally, transversely, and diagonally.

The underframe is then ready for the final welding operations. For this purpose the underframe is stood on its side and all possible downhand welding which can be carried out is completed. The underframe is reversed and stood on the other solebar, where the corresponding downhand welding is completed. The underframe is then mounted on its bogies, and the final welding of the top surface of the underframe is completed, and also the fitting of buffing and drawgear and vestibule gear. The underframe and bogies are scaled and given a coat of primer before final painting; the paint is applied by spray gun.

The erection of the bogies, which are mainly of riveted construction, is car-

(*Continued on page* 329)



Sequence of operations in the underframe shop at Ashford Works

1 and 2. Assembly of longitudinals, cutting to length, and tack welding. 3. Partial welding of cantilever sections and longitudinals. 4 and 5. Underframe assembled in inverted position for further welding 6 and 7. Final welding of underframe assembly. 8. Underframe mounted on bogies. 9. Final adjustment of underframe. 10. Fitting of drawgear, buffing gear, and vestibule gear. 11. Final inspection

Construction of British Railways Standard Coaches—1

Final assembly jig showing the headstock, and underframe members correctly positioned for welding in inverted position

Partially completed underframe being removed from final assembly jig. In the foreground is seen the method used for attaching the cantilevers and longitudinals

Construction of British Railways Standard Coaches—1

Bogie assembly shop showing the mobile jigs used to ensure alignment of framing

A completed underframe being loaded on to its own bogie

RAILWAY NEWS SECTION

PERSONAL

Mr. A. K. Reid, Secretary of the Tasmanian Transport Commission, has been appointed General Manager of the Tasmanian Government Railways.

Mr. A. C. Hartley, C.B.E., B.Sc. (London), M.I.Mech.E., who is President of the Institution of Mechanical Engineers for 1951-52, is Consultant to the Anglo-Iranian Oil Co. Ltd. He was educated at Hymers College, Hull, and the University of London; and after further training, attended the Central Technical College (later the City & Guilds College), Imperial College of Science & Technology, where he was awarded the diploma of Associate of the City & Guilds of London Institute, and graduated with an Honours B.Sc. engineering degree in 1910. Between 1910-12 he was in the Office of the Chief Docks Engineer, Hull, North Eastern Railway, and afterwards served with Rose, Downs & Thompson Limited and the Limmer & Trinidad Lake Asphalt Co. Ltd. From 1916 to 1919 he held a commission in the R.F.C. and R.A.F.; he obtained his pilot's brevet, was promoted substantive Major, and was awarded the military O.B.E., being twice mentioned in dispatches. In 1919 he became a Partner in the firm of Maxted & Knott, Consulting Engineers. Mr. Hartley joined the Anglo-Iranian (then Anglo-Persian) Oil Co. Ltd. in 1924, and went to Persia in 1926, and again in 1931, to deputise for the Assistant General Manager (Technical); when in London he undertook the duties of Chief Engineer. He was seconded to the Iraq Petroleum Co. Ltd. from 1932 to 1934 for the design and development of the Kirkuk to Mediterranean desert oil pipe-lines. He then returned to the Anglo-Iranian Oil Co. Ltd. and held the position of Chief Engineer until December 31, 1950, when he relinquished it to become Consultant to the company. He was elected a Fellow of the City & Guilds of London Institute in 1936. The Anglo-Iranian Oil Co. Ltd. released him in 1940-41 to assist in the development and production of a stabilised automatic bomb sight, and from April, 1942, he was with the Petroleum Division of the Ministry of Fuel & Power. From October, 1942, until the end of the war, he was, in addition, Technical Director of the Petroleum Warfare Department. He was awarded the C.B.E. in 1944 and the United States Medal of Freedom in 1946. Mr. Hartley is a Freeman of the City of London and a Liveryman of the Worshipful Company of Shipwrights. He serves on the Department of Scientific & Industrial Research Mechanical Engineering Research and Building Research Boards, and has been a member of the Mechanical Engineering Industry Standards Committee of the British Standards Institution since 1941. Mr. Hartley has been a Member of Council of the Institution of Civil Engineers.

We regret to record the death on September 16, at the age of 61, of Mr. R. M. T. Richards, O.B.E., M.Inst.T., who retired last year as Deputy Chief Regional Officer, Southern Region, British Railways. He joined the South Eastern & Chatham Railway in 1908, and later was appointed Assistant to the Eastern District Superintendent. In April, 1915, he joined the Railway Operating Division, R.E., in France, and he was demobilised in 1919. He rejoined the S.E.C.R., and was appointed Assistant London District Traffic Superintendent; on the amalgamation he was transferred to Waterloo as Assistant Divisional Superintendent, Southern Railway. In 1930 Mr. Richards was promoted Divisional Superintendent, London (West) Division, where he remained until 1933. In that year he was selected to fill the newly-formed position of Development Officer to the General Manager. While so engaged he undertook an extensive mission to South Africa in 1936, to perfect the relationship between the producers of that country and the Southern Railway. In July, 1937, he became Assistant Traffic Manager, and he visited the U.S.A. and Canada to study port and transport conditions. On January 1, 1940, he was appointed Traffic Manager, during the period in which Sir Eustace Missenden held the position of General Manager in the absence of Mr. Gilbert Szlumper; he was confirmed in the permanent appointment of Traffic Manager in 1942, after

Elliott [*& Fry*

Mr. A. C. Hartley

President of the Institution of Mechanical Engineers for 1951-52

The late Mr. R. M. T. Richards

Deputy Chief Regional Officer, Southern Region, 1948-50

Dr. D. R. Malhotra

President, Engineering & Metallurgy Section, Indian Science Congress Association

Mr. R. J. Purves

Assistant Signal & Telecommunications Engineer, North Eastern Region, 1948-51

Mr. G. C. Thew

Appointed Assistant Signal & Telecommunications Engineer, North Eastern Region

Sir Eustace Missenden had been appointed substantive General Manager. Mr. Richards was appointed Deputy Chief Regional Officer, Southern Region, as from January 1, 1948. During the temporary absence of Mr. John Elliot in Australia in 1949, Mr. Richards served as Acting Chief Regional Officer. He was made an O.B.E., in the New Year Honours, 1943, and was a Chevalier dans l'Ordre de Leopold (Belgium). He was also an Officer of the Order of St. John of Jerusalem. The funeral service is being held at St. John's Crematorium, Woking, at 3 p.m. today, Friday.

We regret to record the death on September 17 at the age of 67, of Mr. Keith R. Shrewsbury, who retired as Publicity Manager of Thos. Cook & Son Ltd. in May, 1948.

Dr. D. R. Malhotra, D.Sc., M.I.Chem.E., F.I.M., F.N.I., who is the first railwayman to be elected President of the Engineering & Metallurgy Section of the Indian Science Congress Association, is Chemical Engineer & Metallurgist, Bombay, Baroda & Central India Railway. He was educated at Harvard and London Universities and at London was a Carnegie Research Scholar. After serving as Research Metallurgist to the Tata Iron & Steel Company, Dr. Malhotra became Chemical Engineer & Metallurgist, B.B.C.I.R., and has held this position for some 20 years. In recent years he was selected by the Railway Board as a member of the Water Softening Committee, which made a comprehensive survey of the water softening problems of Indian railways. Among other positions held by Dr. Malhotra are: Chairman, Indian Railway Chemists & Metallurgists Committee, and Foundry Advisory Committee of the Railway Board; Member, Metals Research Committee of the Council of Scientific Research, Railway Board Research Advisory Committee, and Coal Advisory Committee of the Department of Industry & Supply. During 1950 he was elected Leader of the All-India Engineers' Conference and President of the Engineering & Metallurgy Section, Indian Science Congress Association.

Mr. R. J. Purves, M.I.R.S.E., Assistant Signal & Telecommunications Engineer, North Eastern Region, who, as recorded in our August 24 issue, has retired, joined the North Eastern Railway early in 1902 and served in the Permanent Way and Signalling Works at Park Lane, Gateshead. In 1927 he was transferred to the Chief Engineer's Office at York, was promoted Senior Assistant (Signal & Telegraph) in 1946, and in the same year became Chief Assistant (Signals). On January 1, 1948, when the Signal & Telecommunications became a separate department, he became Assistant Signal & Telecommunications Engineer, North Eastern Region. Early in his career Mr. Purves worked on what was then the largest electro-pneumatic installation in the country at Newcastle and Gateshead, which was completed in 1908, and recently worked on the modern scheme for its replacement. In 1933 he was Resident Engineer on the large scheme for colour-light signalling between York (Poppleton Junction) and Northallerton, on which the first route relay interlocking in the country was introduced at Thirsk. Since then he has been concerned in the continuous development of this type of scheme at important centres in the Region, notably Leeds City South, 1935-1936; Hull Paragon, 1937; Northallerton to Darlington, 1937-1939; and more recently at York.

Mr. George Williams, Assistant Chief Electrical Engineer (New Works), South African Railways, has been appointed Chief Electrical Engineer, in succession to Mr. G. Alan Dalton, who has retired.

Mr. M. Ganapati, Engineer-in-Chief, Indian Railways Locomotive Works, Chittaranjan, has been appointed Engineer-in-Chief, Integral Coach Factory, Perambur.

We regret to record the death on August 30, at the age of 60, of Mr. Emile D. Prevot, Manager of the Canadian National Telegraphs.

The late Mr. S. E. Osborn, who was Chairman of Samuel Osborn & Co. Ltd., left (duty paid £70,489) £143,116.

Mr. G. C. Thew, M.A., A.M.I.E.E., M.I.R.S.E., Outdoor Assistant to Signal & Telecommunications Engineer, North Eastern Region, who, as recorded in our August 31 issue, has been appointed Assistant Signal & Telecommunications Engineer, was educated at Harrow and Cambridge, and joined the L.N.E.R. as a graduate pupil in the Engineer's Department at York in 1929. He was closely associated with the resignalling work between York and Darlington, including Thirsk route-relay interlocking, and signalling schemes at Leeds City South and Hull Paragon stations. In 1939 he was appointed Constructional Assistant (Signal & Telegraph) and had charge of various wartime signalling schemes. In January, 1948, when Signal & Telecommunications became a separate department, Mr. Thew was appointed Outdoor Assistant for the Region.

Mr. Donald Gordon, President of the Canadian National Railways, has been reappointed as Chairman of the board of Directors for a three-year term. Messrs. Wilfred J. T. Gagnon and James A. Northey have been re-appointed for a three-year period as Directors.

The Gold Coast Government has invited Mr. M. R. Bonavia, Principal Works & Development Officer, British Transport Commission, to undertake a survey of transport conditions and to report thereon to that Government. The B.T.C. has agreed to his release and he will be sailing on October 4. Mr. Bonavia hopes to return to this country by Christmas. He will be assisted in the enquiry by Mr. G. R. Hayes, Acquisitions & Permits Officer of the Road Haulage Executive, whom the Executive has agreed to release for this purpose.

Mr. P. Williamson, Yardmaster, Sheffield (Traffic), Eastern Region, who, as recorded in our September 14 issue, has been appointed Stationmaster, Sheffield Victoria, entered the service of the Great Central Railway in 1919, and later occupied positions as Signalman at Warsop, Oughty Bridge, Woodhouse West Junction, Sheffield, and Manchester London

Road. In 1938 he was promoted to the position of District Inspector in the Office of the District Operating Superintendent, Manchester, L.N.E.R., and was appointed Deputy Chief Controller in 1941 in the Office of the District Operating Superintendent, Leeds. He took up the position of Yardmaster, Ardwick (Traffic), Manchester, in 1946, and he proceeded to Sheffield to serve in a similar capacity in 1949.

Mr. Kenneth Cantlie, Overseas Representative of the Locomotive Manufacturers' Association of Great Britain, arrived at Southampton in the *Queen Mary* on September 11. He had left this country in February and has visited the West Indies, the northern countries of South America, and Mexico.

Mr. R. W. Taylor is taking up an appointment on October 1 with Crompton Parkinson Limited, as Product Sales Manager of the Nelson stud welding service; he recently resigned his position as Sales Manager to Cyc-Arc Limited. Mr. R. V. Powditch, Product Sales Manager, Nelson stud welding, will become Product Sales Manager, Crompton Parkinson F.H.P. motors, on October 1.

Mr. R. I. D. Arthurton, a member of the Department of the Chief Mechanical Engineer (Railways), London Transport Executive, who, as recorded in our July 20 issue, has been appointed a Principal Executive Assistant with control, in the development division, of all work in connection with contracts for rolling stock and associated equipments, as well as all internal and external inspection work of the department, is 47. He was educated at Ealing County School and received his technical training at the City & Guilds (Engineering) College, London University. He holds the degree of B.Sc.(Eng.) and is an Associate Member of the Institution of Mechanical Engineers and of the Institute of Transport. After serving his apprenticeship with G. D. Peters & Co. Ltd. at Slough, Mr. Arthurton worked with that company from 1927 until joining London Transport in 1936. Since 1936 he has been associated with the design and manufacture of equipment for all new rolling stock.

Improved Disembarkation Facilities at Holyhead

Electrically operated platforms to reduce gradient of gangways

After the introduction in 1949 of the two new motor vessels *Cambria* and *Hibernia* on the Holyhead-Dun Laoghaire service, the London Midland Region decided to instal two electrically-operated adjustable platforms at Holyhead to speed the movement of passengers between ship and shore. The movable platforms came into operation this summer in time for the peak holiday traffic. They also provide more comfort, as passengers no longer have to negotiate the gangway at a steep angle.

The platforms, adjustable over a height range of 6 ft. 9 in. provide a level gangway at any state of the tide. Each platform comprises a timber deck 10 ft. × 9 ft. 6 in. which projects 4 ft. beyond the face of the Customs building. Twelve independent steps are provided to give access from the platform to the upper floor, built of timber and protected with steel kicking plates and treads, which rest when in the lowest position on padstones in the enclosing walls. As the platform is moved up the steps are picked up in succession by the moving underframe and arranged to form a level surface continuous with the deck. They are held in position by guides which run in small vertical channels recessed in the staircase walls.

Operating Gear

The underframe of the platform was constructed of two 12 ft. × 6 in. rolled steel beams 20 ft. 6 in. long braced together 4 ft. apart and supported at their ends on four bronze nuts which operate on vertical square thread screws. The screws are carried on thrust bearings at their upper ends to ensure that they are always in tension under the weight of the platform. Each screw is supported between a pair of rolled steel channels which form the guides for maintaining the platform in position horizontally. The screws are rotated uniformly by means of an arrangement of bevel gears and shafts taking power through a single worm reduction unit coupled to a 5-h.p. electric motor. The whole of the operating gear is situated on foundations below the lowest level of the platform. An electro-mechanical brake is fitted to ensure that the driving gear is brought to rest and holds the platform in any desired position level with a step. Overrun in either direction is prevented by limit switches, the mechanism being controlled from the upper floor of the Customs House by push buttons.

Before the arrival of the vessel, platforms are positioned at a level to suit the average height of the tide during the disembarkation period, and are maintained in this position until all passengers have landed.

Construction of British Railways Standard Coaches—1

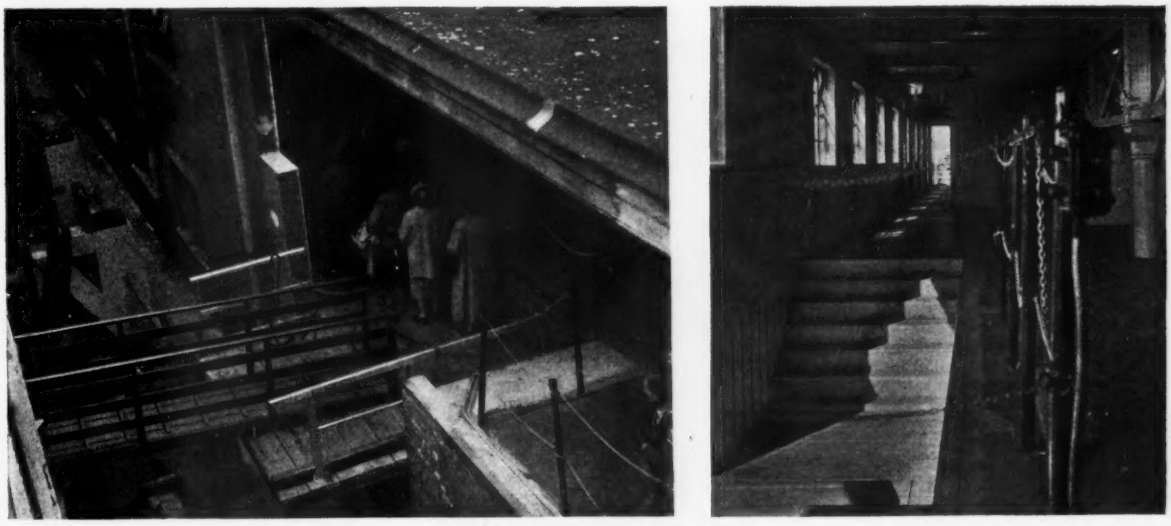
(*Concluded from page* 324)

ried out simultaneously. The bogie solebars are first cut to shape on a double-headed profile oxy-acetylene flame cutter. The frames are then batch drilled in a drilling jig; the holes are drilled to finished diameter. Similar operations are carried out on the axlebox guides.

Bogie solebars to which the axlebox guides are bolted are assembled on mobile jigs, to which are attached dummy axleboxes in which the pair of bogie solebars is located.

The riveting of the axlebox guides to the solebars is then carried out. They remain on these mobile jigs during the erection of the complete bogie, including end framing, bolster, and diagonals. The method of construction ensures complete alignment longitudinally, transversely, and diagonally. The work connected with sub-assemblies, axleboxes, and bearings, is carried out adjacent to the bogie building section.

(*To be continued*)



Gangway (left) in position between platform and vessel during disembarkation; (right) platform in intermediate position, with seven steps level with platform surface and six steps to upper floor

Staff & Labour Matters

Railway Wage Claim

The main features of the Railway Executive offer made to the Railway trade unions on August 28, as recorded in last week's issue, in response to their claims for a 10 per cent. increase in pay are summarised as follows:—

1. A shortening of the Class 5 clerical scale providing for a maximum of £360 in the Provinces and £370 in London at age 26 instead of £345 (provinces) and £355 (London) at age 28.

2. For other male salaried staff the increases vary from £15 to £20 a year.

3. A similar shortening of the scale for female clerical staff giving a weekly rate of 112s. in the provinces and 116s. in London at age 26 compared with 107s. 6d. (provinces) and 111s. 6d. (London) at age 28.

4. For other female clerical staff the increase ranges from 6s. to 8s. a week.

5. For wages staff, the minimum adult rate is increased by 4s. 6d., *i.e.*, from 102s. 6d. to 107s. a week (provinces), London rates being 3s. higher.

6. Shortened service scales for guards, footplate staff and lengthmen and relayers, in addition to increased rates of pay: Guards—maximum obtained in third year instead of fifth year; drivers, motormen, and firemen, maximum in fifth year instead of sixth; and lengthmen & relayers, maximum in second year instead of third.

7. Introduction of Special Class posts in the case of chief linemen, linemen, and assistant linemen in the Signal & Telecommunications Department.

8. Substantial increases for junior staff.

Examples of Increases

Examples of the various proposed increases (provincial rates) are as follows:—

Grade	Present rate	Proposed rate
Clerk, Class 5—	£ p.a.	£ p.a.
Age 18	205	220
21	245	265
26	310	360 (max.)
Station Inspector—		
Maximum, Class 3	420	435
	s. d. a week	s. d. a week
Ticket collector ...	115 0	120 0
Station foreman ...	122 0	130 0
Goods checker ...	111 0	116 0
Guard		
1st year	109 0	120 0
3rd year ...	115 0	130 0 (max.)
5th year	122 0 (max.)	130 0
Signalman		
Class 4	114 0	119 0
Class 2	123 0	129 0
Engine cleaner ...	102 6	107 0
Fireman		
1st year	110 0	120 0
5th year	122 0	131 0 (max.)
6th year	126 0 (max.)	131 0
Driver		
1st year	133 0	139 0
5th year	145 0	155 0 (max).
6th year	149 6 (max.)	155 0
Carriage serviceman	102 6	107 0
Lengthman and relayer		
1st year	102 6	107 0
2nd year ...	104 0	112 0 (max.)
3rd year ...	106 0 (max.)	112 0
Lineman class 2 ...	122 0	129 0

Flat Rate for Saturday Work

In response to the claim from the A.S.L.E.F. for enhanced payments to be made for weekend working, the Railway Executive offered to make additional flat-rate payments to staff in salaried and conciliation grades in respect of full turns of duty commencing on Saturday afternoons.

Where the booking-on time is between 2 p.m. and 6 p.m., flat-rate payment is 4s. when the net rate of pay is 130s. a week or less, and 5s. when the net rate exceeds 130s.; where the booking-on time is between 6 p.m. and 8 p.m., the corresponding flat-rate payments are 2s. and 2s. 6d. The booking-on time relates to the commencing time of the shift for the day, and not (for example) to the time of commencing the afternoon part of a shift after a meal interval.

Discussion of Railway Unions' Claim

A meeting of the Railway Staff National Council took place on September 18, but was adjourned until today (Friday) to enable the unions to consider their attitude.

The Railway Executive offer was not acceptable to the unions, which contended that the proposed rates were inadequate in relation to the rise in the cost of living since last January, and also in comparison with pay in other industries. In commenting on the offer in the *Railway Review*, September 14 issue, Mr. J. B. Figgins, General Secretary of the N.U.R., states that the increases and percentages fall far short of the unions' claim, and that he is sure the membership will approve the unanimous decision of their Executive Committee in rejecting it. At a meeting of railwaymen at Oswestry last week, Mr. Figgins described the Railway Executive proposals as "miserable increases." He added that his union could declare a strike officially. The 10 per cent. general increase sought by the unions had been considered an irreducible minimum.

Irish Seamen's Strike

The Maritime Board met in Dublin on September 18 to seek a basis of settlement of the strike (referred to in our September 7 issue), then in its twentieth day. Representatives of the unions concerned attended, also officials of the National Union of Seamen which, although not involved, is concerned in the outcome of the Irish seamen's wage claim, which precipitated the strike. It was decided that direct negotiations should begin, and that if any matter could not be resolved an independent chairman should be appointed. The meeting adjourned.

Busmen's Wage Claim

No agreement was reached between representatives of the London Transport Executive and the Transport & General Workers' Union at a meeting earlier this week regarding a wage claim on behalf of 58,000 bus, tram, and trolleybus employees. The union has rejected an offered increase of 7s. a week. The talks were adjourned until next week.

A dispute over a similar rejected offer by 90,000 employees of privately owned road passenger transport undertakings was due to be referred to arbitration within a few days.

Road Haulage Wage Increase

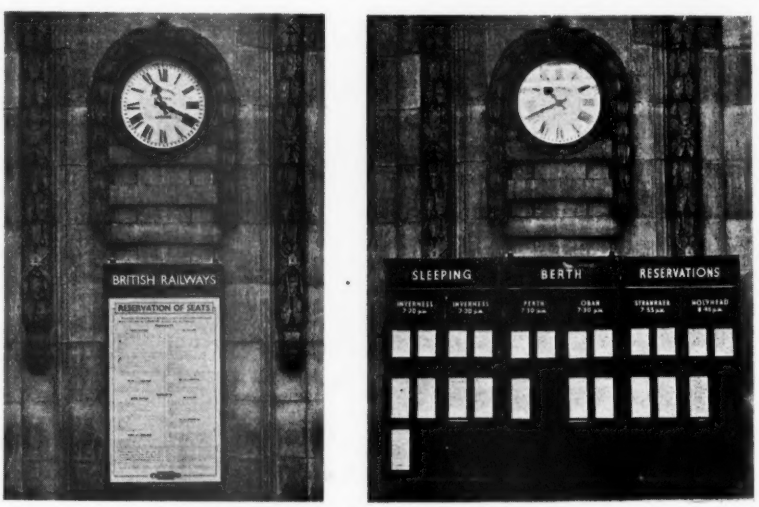
The Minister of Labour has made a wages regulation order to give effect to the proposals of the Road Haulage Wages Council for increasing the statutory minimum pay of haulage workers employed in connection with vehicles operating under "A" or "B" licences.

Sleeper Berth Reservation Indicator

A new indicator providing information about sleeper allocations and designed by the Public Relations & Publicity Department of the London Midland Region has recently been installed at Euston Station. It was decided to fix the indicator where intending passengers are most likely to pass, and the site chosen was under the clock, where all taxis and private cars set down, and close to the stream of traffic from Underground and suburban lines.

It was considered desirable that the indicator should be in harmony with neighbouring structures, and when not in use—which is most of the day—it should serve some other purpose. This has been achieved by producing a folding case comprising three hinged panels which, sandwiched together, form what appears to be a standard headed traffic board. To bring the indicator into use a small catch is slipped and the board then unfolds into a triptych which displays information on three panels.

The panels are constructed of 27½ in. x 49½ in. oak ply with 1 in. oak framing and the interior is polished to a mid-oak finish. The fittings comprise 12 bronze frames with spring hinges, size 10 in. x 5¼ in. each panel, and the sprung frames hold the standard sleeping berth allocation lists by the edges so that the information thereon is readily available without interfering with



Sleeper berth reservation indicator board installed at Euston Station in the closed and open positions

the lists. Extra heavy bronze hinges have been used as the structure is very solid. The title plates and the various heading plates describing the trains are made of Permart, which is a form of covered 16 gauge aluminium.

Six trains are shown at any one time, and two complete changes, *i.e.*, 12 trains, take care of the maximum nightly requirement at Euston. As each heading fitment will hold two plates, and all plates are double-sided, there is an ample reservoir of headings for trains running only at weekends.

NATIONAL SAVINGS MOVEMENT.—From the beginning of October until March, 1952, the National Savings Movement, with its 300,000 voluntary workers, will be engaged in an intensive "Lend Strength to Britain" drive for more savings to help finance the rearmament programme and to check the rising cost of living. For this purpose the advantages of investing in the new 3 per cent. National Savings Certificates and Defence Bonds will be stressed.

International Timetable Conference

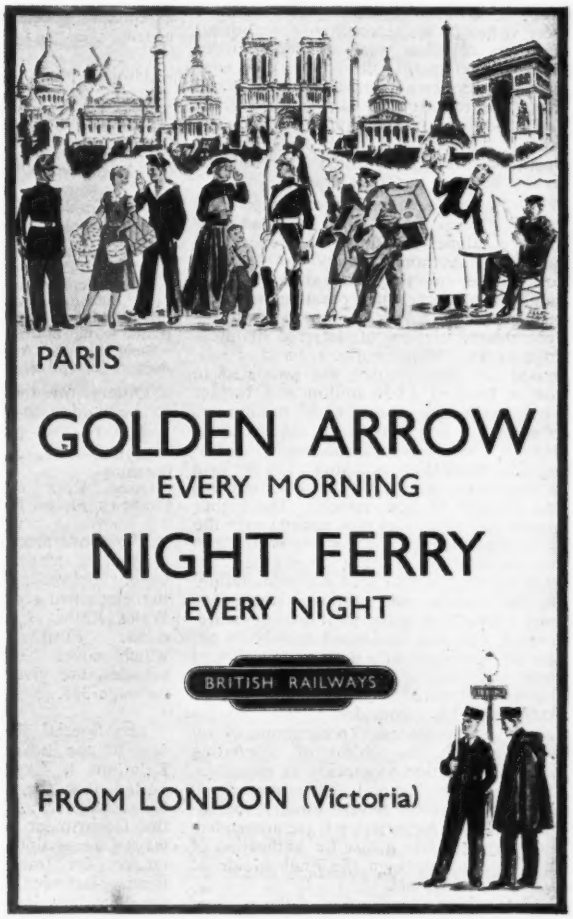
The International Timetable & Through Carriage Conference, held last year at Amsterdam, is being held this year in Oslo from September 26 to October 6 inclusive. Meetings of delegates to the Conference will take place in the Redernes Hus, although some discussions concerning commercial matters relating to the larger express train services will take place in the building of the Corps des Marchands.

Delegates from railways and other undertakings in Belguim, Bulgaria, Denmark, Germany, Great Britain, Finland, France, Greece, Hungary, Italy, Luxembourg, Netherlands, Norway, Austria, Poland, Roumania, Sweden, Switzerland, Czechoslovakia, Turkey, U.S.S.R., Jugoslavia, Syria, and Iraq will attend.

Nearly two hundred items were sent forward to the Managing Administration, the Swiss Federal Railways, for inclusion in the agenda, covering timetable and through carriage matters in regard to train services between the European countries for 1952. The main task of the delegates will be to finalise train times and through carriages for next year from May 18, 1952, and draw up new services and improve existing services for the traffic next summer. The first few days will be devoted to discussing the timetable of the principal expresses ("Simplon-Orient," "Taurus," "Orient," "Arlberg-Orient," "Nord," "Scandinavian-Swiss-Italian," and "Balt-Orient"). Group meetings will take place to determine services between countries, such as between Great Britain and France, Belgium, the Netherlands, Switzerland, Italy, Germany, and Scandinavia.

The following British Railways delegates will attend the Conference:—Messrs. R. H. Hacker (Chief Continental Officer, Railway Executive), R. E. Sinfield (Continental Superintendent, Southern Region), L. H. K. Neil (Continental Traffic Manager, Eastern Region), S. W. Smart (Superintendent of Operation, Southern Region), E. W. Dean and H. B. Colgate (Southern Region) and T. A. Smith and P. C. Henley (Eastern Region).

Southern Region Channel Services Publicity



New posters designed by Helen McKie for the Publicity Department of the Southern Region, British Railways. One is for display in France, the other in Britain. The basic design is constant, allowing overprinting of appropriate wording as necessary

Review of Trade Harbours

A review of the principal port areas of Great Britain has been made by the Docks & Inland Waterways Executive in a series of reports to the British Transport Commission between 1948 and 1950, published last week under the title *Review of Trade Harbours*.

The Executive was requested to advise the Commission upon ways of securing the efficient and economical development of ports, including maintenance or management, and to state what schemes should be prepared for submission to the Minister of Transport. The Commission has already submitted a scheme for the river Tees and the Hartlepools, and proposes to exercise scheme-making powers under Section 66 of the Transport Act in the cases of the Clyde and Aberdeen.

The reports now published cover the Forth; Dundee; the North East Coast; London; Merseyside, Manchester, and Preston; Bristol and Avonmouth; and Cumberland; and contain the impressions and recommendations of the Executive in respect of each of these areas.

The following are some of the conclusions and recommendations:

London: The most disturbing factor in the port is the state of labour relations. Permanent improvement could be achieved if the Port Authority were reconstituted to provide greater and more direct representation of labour; if greater responsibility were vested in the reconstituted Authority; if closer cohesion were secured between employers coupled with greater co-operation between employers and unions, and the standardisation of labour agreements and conditions as a corollary to the dock labour scheme; and if a spirit of co-operation were substituted for one of rivalry between the trade unions.

The port suffered extensive damage from enemy action during the war and war damage alone amounted to over £13 million. Authority policy has been to concentrate on the restoration of war damaged property, incorporating improvements where possible and to overtake accumulated arrears of deferred maintenance works. Major works in hand or submitted for authorisation are estimated to cost a total of £5·86 millon and further works estimated to cost £4·55 million are in contemplation. In consequence of war damage, there is still a shortage of berthing accommodation, accentuated in the case of deep-water berths by the increased size and draught of new vessels. The higher proportion of cargoes now passing over the quays and the expansion of export trade in the post-war years have emphasised the need for more transit shed accommodation; on the storage side, although there has been a reduction in the total quantity warehoused, this was attributed mainly to the loss of space through destruction, though there has been a continuing demand for increased covered accommodation. The Authority has considered the various factors and prepared a programme of rebuilding with the object of alleviating present congestion as quickly as possible.

Bristol: The general unification of all the harbours in the Severn estuary, including the Welsh ports, was not recommended, but there might be a case for unification of the trade harbours on the English side of the Bristol Channel.

Cumberland: Unification of the ports of Workington, Barrow-in-Furness, and Whitehaven, or the formation of a larger group extending to Preston are to be further considered.

Dundee: The establishment should be considered of an estuarial authority to include Tayport and other small harbour undertakings on the Tay.

Firth of Forth: Unification of ownership and management, to include the functions of the Forth Conservancy Board, would assist development of the port services.

Manchester, Merseyside, and *Preston*: There should be co-ordination for the purposes of planning expenditure, development, and operating policy. At Liverpool and Birkenhead, there is lack of balance in the composition of the Port Authority. A measure of control by the B.T.C. of capital expenditure and related financial matters is desirable.

North-East Coast: As a first stage towards unification a scheme should be promoted to bring the trade harbours of the Wear under one management.

Copies of the reports may be obtained from the Docks & Inland Waterways Executive, 22 Dorset Square, London, N.W.1, price 2s.

Contracts & Tenders

Coras Iompair Eireann has placed a contract with the Metropolitan-Cammell Carriage & Wagon Co. Ltd. for 450 wagon underframes, to be 16 ft. 11 in. long over headstocks. The order is exclusive of buffing and drawgear, springs, brakework, axleboxes wheels and axles, and axleguards.

The Egyptian Government has recently placed the following contract with Simmering - Graz - Pauker, A.G., Vienna, Graz.

60 10-ton animal trucks.
57 10-ton trucks for perishable traffic.

The Rhodesia Railways have placed the following contracts:—

Metropolitan-Cammell Carriage & Wagon Co. Ltd.: 450 bogie high-side wagons.

Gloucester Railway Carriage & Wagon Co. Ltd.: 60 bogie goods guards vans.

Rail Makers' Association: 250 miles of B.S.60 R. flat-bottom rails.

Steel Sleeper Association: 200 miles of sleepers for B.S.60 R. flat-bottom rails.

Orders for the appropriate fastenings to be used with the above sleepers and rails have been placed as follows:—

Bayliss, Jones & Bayliss Limited: Rail fastenings.

Guest Keen & Nettlefolds (Midlands) Limited: Sleeper fastenings.

The Government of New South Wales is inviting tenders for the manufacture, supply, delivery, erection, and testing on the electrified sections of the New South Wales Railways, of electric train equipment. Further details of the tenders, which cover 530 motor and 510 trailer vehicles, are given under Official Notices on page 335.

The Special Register Information Service of the Board of Trade Commercial Relations & Export Department has reported that the United Kingdom Trade Commissioner at Melbourne has notified the Department that the Victorian Railways Commissioners have issued a call for tenders for track sleepers and rail to sleeper fastenings. Tenders should reach the Secretary for the Victorian Railways, Melbourne, before 11 a.m. on November 28.

A copy of the tender documents is available for inspection by representatives of United Kingdom manufacturers at the Commercial Relations & Exports Department (Industries Branches), Board of Trade, S.W.1. Additional copies of the tender may be obtained from the Agent General for Victoria in London.

A further report from Melbourne quoted by the Board of Trade Special Register Information Service states that the Transport Department of Tasmania, Railway Branch, has issued a call for tenders for 140 wagon underframes complete with bogies. Tenders should reach either the Secretary for Railways, Box 624D, G.P.O, Hobart, Tasmania, or the Agent General for Tasmania, 457, Strand, Charing Cross, London, W.C.2, by 5 p.m. on November 30, and should be endorsed "Tender for Wagon Underframes No. 953."

A copy of the tender documents and drawings is available for inspection by representatives of interested United Kingdom manufacturers at the Commercial Relations & Exports Department (Industries Branch), Board of Trade, S.W.1. Additional copies of the specification are available at the Office of the Agent General for Tasmania, London, W.C.2.

A report from the First Secretary (Commercial) at the British Embassy, Rio de Janeiro, quoted by the Special Register Information Service of the Board of Trade Commercial Relations & Exports Department, states that the Recife Department of Ports has issued a call for tenders for:—

(*a*) 20 flat wagons with minimum capacity of 30 tons, floors of steel sheeting of ⅜ thickness, length 12 m., width 2·40 m., 1 m. gauge, with eight sockets on each side and two at each end, with automatic couplings.
Four closed wagons of corrugated steel, double sliding doors, of the same dimensions as the flat wagons
(*b*) One electric mechanical locomotive with 300 tons hauling capacity, 1 m. gauge, motor with preference of 1,000 r.p.m., maximum speed hauling 300 tons—30 km.p.h.

Tenders should reach the Departamento Comercial do Porto, Recife, Pernambuco, Brazil, before October 20.

BRITISH ROAD SERVICES TELEPRINTER NETWORK.—The teleprinter service operated by British Road Services is to be extended to cover some 180 group offices throughout the country, in addition to headquarters, divisional, and district offices, thus effecting economy in trunk telephone calls and at the same time increasing operational efficiency. Services at present operating link up London, Norwich, Birmingham, Manchester, Huddersfield, and Glasgow. This system will form the basis of a main network linking all major centres in the country.

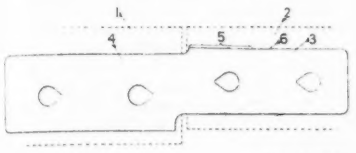
REINFORCED CONCRETE POLES FOR ELECTRICAL TRANSMISSION AND TRACTION LINES.—The present revision of this British Standard (B.S. 607:1951) has been prepared to clarify still further design requirements and test procedure. This specification is not intended to cover either lamp standards or poles reinforced by means of pre-stressed steel. The classification of poles has been simplified and a new class has been included, lighter than those previously covered, so that there are now six classes based on minimum transverse loading tests applied 2 ft. from the top. Copies may be obtained from the British Standards Institution, Sales Department, 24, Victoria Street, London, S.W.1. Price 2s.

ABSTRACTS OF RECENT PATENTS*

No. 634,064. Fishplates

Henry Williams Limited and O. R. Williams, both of Railway Appliances Works, Darlington. (*Application date*: *March* 25, 1948.)

A fishplate for use when joining a new rail 1 to a worn one 2 has one half 3 raised in relation to the other 4, so that, in effect, it raises the worn rail and compensates for its worn upper surface. In addition, the inner part 5 of the upper surface 6 is tapered slightly to compensate for wear of the underside of the upper flange, this normally increasing towards the end of the rail. Fishplates of various dimensions may be produced to cater for different circumstances, but for general use the section 3 would be ¼ in. above section 4 and the tapered length 5 would extend 3½ in. from the step, and rise $\frac{1}{16}$ in. at the inner end.



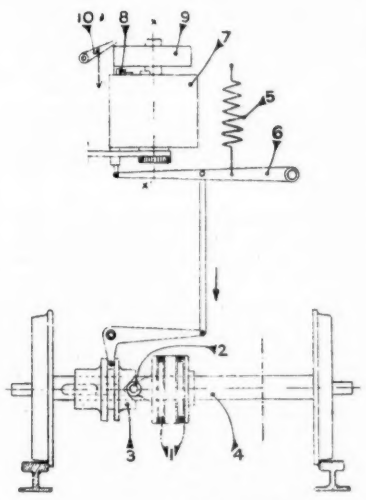
R.G. 634,064/48

No. 634,208. Braking

Tecalemit S.A. of 18, *Rue Brunel, Paris.* (*Convention date*: *July* 2, 1946.)

An arrangement for braking a train of vehicles in accordance with the adhesion prevents locking of wheels at the rear of the train when it travels from a section of less to greater adhesion. A pulley 1, loose on one axle of a bogie at the front of the train, is belt-driven from a smaller pulley on the adjacent axle, so that it rotates at a speed less than that of the axle on which it is mounted. A roller 2 carried by it thus turns relatively to a notched sleeve 3 keyed to, but longitudinally slidable on, the axle 4. The relative motion presses the sleeve 3 back until the restoring force of spring 5 prevents further movement and the wheels on this axle are made to slip on the rails although still turning. The extent of movement of the lever 6 thus serves to measure the adhesion. The device 7 consists of a drum which is rotated through gearing so as to make a complete revolution in the time taken for the train to travel its own length, and it contains a series of longitudinally slidable rods 8, the position of each of which is set in turn by the lever 6 so as to indicate the instantaneous value of the adhesion, being lower for increased adhesion. Their upper ends bear against a disc 9 and this, through a follower lever 10, determines the braking effort.

The braking therefore cannot be greater than that in accordance with the least adhesion of the length of track covered by the train, the highest rod 8 maintaining the reduced braking effort until reset by the lever 6, *i.e.*, until the whole train has passed the point of low adhesion.



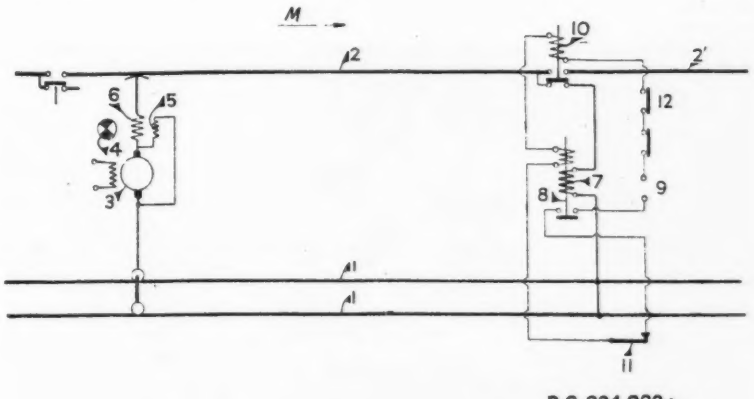
R.G. 634,208/47

No. 634,082. Signalling Arrangements

Société Auxiliaire d' Etudes Electrotechniques, 44, *Rue de Lisbonne, Paris.* (*Convention date*: *April* 11, 1945.)

A signalling device using the track rails 1 and a signal wire 2 is fed by a generator 3 driven by the locomotive and giving an output voltage proportional to its speed. On the locomotive an indicator 4 is actuated by two coils, one 5 operated in dependence on the voltage of the generator and the other 6 on the current passed around the circuit 1, 2. The power supplied to actuate the indicator depends on the square of the voltage, and thus of the speed, and also the current depends on the length of track between the locomotive and the track equipment, from which it may be deduced that the indicator operates at a distance from the equipment proportional to the square of the train speed.

Since braking distance is also proportional to the square of the speed the indication is received at a distance sufficient to stop the train regardless of its speed. The track equipment is in the condition shown when the oncoming train may proceed. Current from the generator 3 energises relay coil 7 when it reaches a sufficient value, and, as it is proportional to the speed but inversely proportional to the distance of the train, it is operated at a constant time before the arrival of the train, irrespective of its speed. When this occurs, relay armature 8 closes its contacts and a local battery 9 holds it energised and operates relay 10 to connect signal wire 2 to the following section 2^1. When the train reaches the track equipment it trips track contacts 11 to restore the original conditions. Contacts 12 are connected to a local signal or other device to prevent release of the indicator 4 if it is unsafe to proceed.

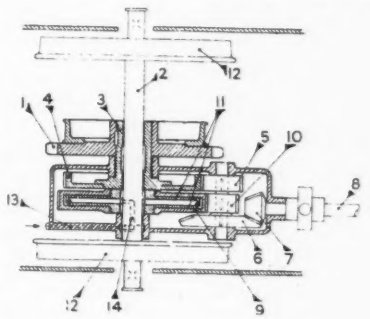


R.G. 634,082/46

No. 634,522. Rack Drives

Schweizerische Lokomotiv-und-Maschinenfabrik of Winterthur, Switzerland. (*Convention date*: *July* 5, 1946.)

In a rack-driven locomotive an oil-pressure operated clutch is provided for optionally connecting the running wheels to the rack gear. The rack engaging gear 1 is loosely mounted on the axle shaft 2 by means of a sleeve 3 and is continuously driven, through gears 4, 5 and bevels 6, 7, by a motor shaft 8. A hollow gear 9 is also positively driven through a pinion 10 by the shaft 8 and contains clutch plates 11 slidably keyed to the axle shaft 2. When the wheels 12 are to be coupled to the drive, oil under pressure is introduced through ducts 13, 14 into the space between the clutch plates, which are thus forced apart into engagement with the gear 9.



R.G. 634,522/47

* These abridgments of recently published specifications are specially compiled for *The Railway Gazette*, by permission of the Controller of His Majesty's Stationery Office. Full specifications can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, price 1s. each

BRITISH RAILWAYS COAL AND STEEL CARRYINGS.—During the weekend to September 17, British Railways cleared 351,440 tons of coal from deep-mined pits and opencast sites, making a total of 3,175,200 tons for the week. The latest figures for iron and steel show that 199,316 tons were conveyed during the week ended September 8 from the principal steelworks.

Notes and News

Tracer Required.—An experienced tracer is required by a London firm in the Victoria area. See Official Notices on page 335.

Draughtsman Required.—There is a vacancy with the Gloucester Railway Carriage & Wagon Co. Ltd., Gloucester, for a draughtsman. See Official Notices on page 335.

Dover-Dunkirk Train Ferry.—The through sleeping-car ("Night Ferry") service between London and Paris is now running normally, after repair of the damage to the lock gates at Dunkirk referred to in last week's issue.

Indian Railway Grouping.—An agency message states that the Scindia, Dholpur and Nizam's State Railways are being merged with the Great Indian Peninsula Railway to form the Central Railways, as part of the Indian re-grouping scheme. The 5,500-mile long system is expected to be inaugurated in November.

B.T.C. Police First Aid Competition.—Mr. John Elliot, Chairman of the Railway Executive, presented the prizes at the third annual first-aid competition of the British Transport Commission Police, which was held in London on September 13. The North Eastern Area (Darlington) team was placed first among the six teams competing, with the London Area (Liverpool Street) team second, and the South Western Area (Dover Marine) team third. The members of the Darlington team who received the Sir Bertram Ford Challenge Trophy were Sergeant W. J. Neilson (Captain), P.C. F. A. Johnson, P.C. J. H. Clark, and P.C. A. D. Scott. The championship trophy was presented by the St. John Ambulance Association, under whose ægis the competition was held. Lt.-General Sir Henry Pownall, Chancellor of the Order, presided at the prize-giving. Also present were Mr. V. M. Barrington-Ward, Member of the Railway Executive, and Mr. W. B. Richards, Chief of Police, British Transport Commission.

La Guaira & Caracas Railway Co. Ltd.—An extraordinary meeting of the La Guaira & Caracas Railway Co. Ltd. and the Bolivar Railway Co. Ltd. will be held at Dashwood House, 69, Old Broad Street, E.C., on October 11, to consider a special resolution to wind up the company voluntarily.

Antofagasta (Chili) & Bolivia Railway Co. Ltd.—The directors of the Antofagasta (Chili) & Bolivia Railway Co. Ltd. have decided to pay, on account of arrears, a dividend of 2½ per cent., less income tax, on the 5 per cent. cumulative preference stock. The payment will be made on October 25.

Centenary of Derby Railway Institute.—On September 14 members of the Derby Railway Institute held a dinner and dance to celebrate the formation of the Institute 100 years ago. Six men started the movement in 1851, and today the Institute has grown into a building housing over 20,000 books and including a restaurant, billiards and tennis facilities, and concert hall. Many historical railway documents are preserved there.

Sleeping Car Services: West Riding-London.—From October 1 the North Eastern Region is introducing as an experiment a sleeping car with six first class and 14 third class berths available in each direction between Leeds City and London St. Pancras. Sleeping car passengers may join at 11 p.m. at both Leeds City and St. Pancras. The northbound service from London will be at 11.50 p.m. daily except Sundays and the southbound at 2.42 a.m. from Leeds. This car will also run Sunday night-Monday mornings from Leeds. The 11.50 p.m. from St. Pancras is due at Leeds at 6.23 a.m. although passengers will be allowed to remain in the car until 7.30 a.m. The 2.42 a.m. from Leeds is timed to arrive in St. Pancras at 8.5 a.m.

Exhibition of Railway Tickets.—Between November 24 and December 15 an exhibition of railway tickets is being held at Hove Public Library. The exhibition is to be world-wide in scope and will be drawn from the collection of 8,000 tickets owned by Mr. G. H. Fairchild, of Brighton.

Associated Electrical Industries Limited.—The directors of Associated Electrical Industries Limited announce the payment on October 17 of an interim dividend of 7½ per cent., less tax, on the ordinary stock. The object in paying an interim dividend of 7½ per cent. as compared with 5 per cent. in 1950 is merely to divide the total dividend payment in more suitable proportions.

Railway Track Equipment for Persia Requisitioned. — The Foreign Office announced on September 14 that in conformity with the economic measures designed to protect the economy of the United Kingdom, H.M. Government had requisitioned 3,000 tons of railway track equipment *en route* for Persia, which would be returned to Great Britain. The British Government, it was stated, accepted responsibility for reimbursement to Persian buyers for the sums actually paid for the goods.

New Zealand Railwaymen's Strike.—Further to the report in our April 6 issue we learn that the 14,000 New Zealand railwaymen did not strike in sympathy with the waterside workers during the waterfront dispute. In fact, the largest railway employees' association, the Amalgamated Society of Railway Servants, instructed members "not to handle goods which in the ordinary course would be handled by waterside workers." This direction was revoked on April 3, after a ballot. At no time was there the suggestion that railwaymen might strike in support of the waterside workers.

No. 7 Movement Control Group, R.E., Supplementary Reserve.—The first annual camp of the recently formed No. 7 Movement Control Group, R.E., Supplementary Reserve, was held at Longmoor from August 18 to September 1. The group draws its personnel mainly from the North of England, and contains also a number of railwaymen from Scotland and parts of the North Eastern, Eastern, and London Midland Regions of British Railways. The unit was brought up to strength by the inclusion of "Z" reservists and under the command of Major K. Shannon a full programme of military and technical training was carried out. The programme culminated in a march-past by the whole group after a drill competition in which a very high standard of drill was reached.

Institute of Transport, Metropolitan Section.—The first meeting of the Institute of Transport, Metropolitan Section, for the Session 1951-52 will be held on November 5, when Mr. G. F. Sinclair will read a paper on "Passenger Transport in Athens." This and other meetings will be held at the Institute of Transport, 80, Portland Place, London, W.1, at 5.30 for 6 p.m. The syllabus for the remainder of the session is as follows: December 3, Annual General Meeting, and "Inde-

Mr. John Elliot, Chairman of the Railway Executive, presenting prizes to the North Eastern Area (Darlington) team which won the first-aid competition of the British Transport Commission Police on September 13 (see paragraph above)

OFFICIAL NOTICES

DRAUGHTSMEN required. Pension scheme in operation.—Apply GLOUCESTER RAILWAY CARRIAGE & WAGON COMPANY, Gloucester.

RAILWAY POSTCARDS.—3d. to 2s. each offered for old Coloured Cards Locomotives or Trains. —EDGE, 19, Greenbank Avenue, Heatonmersey, Stockport.

DRAUGHTSMAN required with experience of railway rolling stock, by a firm situated in North Midlands. Salary in accordance with previous experience and qualifications.—Apply Box 203, *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

JUNIOR TRAFFIC OFFICIALS with railway traffic apprenticeship experience. Age about 25, single, required for service on railways in Peru and Bolivia. Apply to the Secretary of the PERUVIAN CORPORATION LIMITED, 144, Leadenhall Street, London, E.C.3.

A VACANCY exists on the staff of an old-established British firm of Engineers and Merchants in India for an Engineer Salesman with Locomotive or Railway experience. Candidates should be between the ages of 22 and 27. Initial agreement three years. Salary £1,200 plus Provident Fund, return passages, leave, certain allowances and good prospects.—Apply Box 210, *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

GOVERNMENT OF NEW SOUTH WALES

TENDERS are invited for the manufacture, supply, delivery, erection, and testing on the electrified sections of the New South Wales Railways of electric train equipments for alternatively:—70 Motor Cars and 70 Trailer Cars for inter-urban lines; 102 Motor Cars and 98 Trailer Cars for suburban lines; 153 Motor Cars and 147 Trailer Cars for suburban lines; 205 Motor Cars and 195 Trailer Cars for suburban lines. Particulars and forms of tender can be obtained by *bona fide* tenderers upon application to the undermentioned address, to which tenders are returnable not later than Twelve Noon on Wednesday, January 30, 1952.—AGENT GENERAL FOR NEW SOUTH WALES (Engineer's Branch), 56-57, Strand, London, W.C.2.

INTERNATIONAL RAILWAY ASSOCIATIONS. Notes on the work of the various associations concerned with International traffic, principally on the European Continent. 2*s*. By post 2*s*. 2*d*. *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

RAILWAY MAINTENANCE PROBLEMS. By H. A. Hull (late District Engineer, L.M.S.R.). Valuable information. With much sound advice upon the upkeep of permanent way. Cloth, 8½ in. by 5½ in. 82 pp. Diagrams. 5*s*. By post 5*s*. 3*d*. *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

AN Insurance Organisation with extensive connections in the transport industry has vacancies on its outdoor staff for a number of young men. Excellent opportunities to those possessing good personality and anxious to succeed. Write stating age to Box 197, *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

EXPERIENCED Tracer required by London firm in Victoria Area for drawing work, tracing and general office duties. Write stating age and experience.—Box 215, *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

BOUND VOLUMES.—We can arrange for readers' copies to be bound in full cloth at a charge of 25*s*. per volume, post free. Send your copies to the SUBSCRIPTION DEPARTMENT, Tothill Press Limited, 33, Tothill Street, London, S.W.1.

THE "PAGET" LOCOMOTIVE. Hitherto unpublished details of Sir Cecil Paget's heroic experiments. Eight single-acting cylinders with rotary valves. An application of the principles of the Willans central-valve engine to the steam locomotive. By James Clayton, M.B.E., M.I.Mech.E. Reprinted from *The Railway Gazette*, November 2, 1945. Price 2*s*. Post free 2*s*. 3*d*. *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

pendent Hauliers & the Transport Act, 1947," by Mr. W. Fraser; January 7, 1952, "The Complementary use of Rail & Road Transport for Freight Traffic," by Mr. A. A. Harrison; February 4, Symposium on Railway Transport in U.S.A., Messrs. A. Dean (Engineering), Frank Gilbert (Labour), S. G. Hearn (Operating), A. C. B. Pickford (Commercial); March 3, "The Organisation & Progress of the Ulster Transport Authority," by Mr. J. A. Clarke; April 7, "Administration in Transport," by Mr. Michael Robbins.

Skefko Ball Bearing Co. Ltd.—The directors of the Skefko Ball Bearing Co. Ltd. announce that the issue to stockholders of 400,000 new ordinary shares of 5s. each on the basis of one new ordinary share of 5s. for every eight ordinary stock units of 5s. held will be made at a price of 30s. a share.

Gloucester Railway Carriage & Wagon Co. Ltd.—The final dividend of the Gloucester Railway Carriage & Wagon Co. Ltd., is 3¾ per cent. This makes 7½ per cent., less tax, for the year to May 31, on a capital of £1,050,000 as increased by a scrip bonus of 100 per cent. last October. For 1949-50 the total distribution was 15 per cent., in two equal payments, on the old capital.

Constructional Steelwork Productivity.—Under the auspices of the Anglo-American Council on Productivity, with E.C.A. aid, a team of 14 representatives of the British constructional steelwork, bridge building, and mechanical handling interests, is leaving for the United States today, September 21. The team will be led by Lt.-Colonel H. B. Denton, Chairman, Joseph Parks & Son Ltd.

Scottish Region Stations Closing.—As from October 1 the passenger train service will be withdrawn from the Inveramsay-Macduff branch line in the Scottish Region. Stations affected are Inveramsay, Wartle, Rothie Norman, Fyfie, Auchterless, Turriff, King Edward, Banff Bridge, and Macduff. An alternative train service is available at Banff for Banff Bridge and Macduff and bus services operate from Aberdeen to places from which the service is being withdrawn. On the same date the passenger train service will also be withdrawn from the Hamilton-Brocketsbrae branch, stations affected being Larkhall East, Dalserf, Netherburn, Tillietudlem, Auchenheath, and Brocketsbrae. An alternative passenger train service is available at Larkhall Central and bus services operate between Hamilton and the places previously served.

Northern Ireland Transport Tribunal.—The preliminary sitting of the Northern Ireland Transport Tribunal, appointed to investigate the operation of the Ulster Transport Authority, will take place on September 28. The meeting will be for the purpose of determining procedure; the Tribunal will then hear all persons or bodies who may have evidence or recommendations to offer, and will consider questions as to the preparation of evidence and subsequent sittings.

Special Trains for Yorkshire Tour.—More than 550 pharmaceutical chemists and their friends in conference at Harrogate made a pleasure trip to the Yorkshire coast in two special trains provided by the North Eastern Region of British Railways on September 12. These trains, with restaurant cars for lunch and dinner, left Harrogate at 9.48 a.m. and 10.15 a.m., passing *via* York, Malton, Pickering, to the Esk Valley and Whitby. After three hours in Whitby 20 motor coaches took them to Scarborough, and the return from Scarborough was made by special trains three hours later.

Liverpool Street-Shenfield Electrification.—The Eastern Region of British Railways announces that a major operation in connection with the track will be carried out between Romford and Gidea Park between September 29 and October 28. Total possession will be required of the up and down electric lines between these points. A number of trains from Liverpool Street to Gidea Park will terminate at Chadwell Heath and Romford, and others from Gidea Park to Liverpool Street will start from Romford and Chadwell Heath. All services on this line may be subject to slight delays.

George Cohen, Sons & Co. Ltd.—A summary of the activities of George Cohen, Sons & Co. Ltd., with the report for the year ended March 31, shows that the group turnover amounted to £11,889,000, as compared with £9,618,000 for 1950, representing an increase of £2,271,000. Taxation of profits absorbed £526,000, against £223,000, and the net amount paid to stockholders £112,000 against £104,000. The consolidated trading profits jumped by £524,944 to £1,024,090. The dividend on the ordinary shares is raised from 20 to 23 per cent. Mr. C. M. Cohen, Chairman & Managing Director, refers in his statement to the combined effect of the fall in the value of the £ and the crushing burden of taxation. Their plants continued to extend the range and scope of their products and orders on hand had reached a record level.

Vacuum Oil Co. Ltd.—The net profit of the Vacuum Oil Co. Ltd., for the year ended December 31, 1950, amounted to £444,319, after making provision for taxation on current profits and transferring £261,500 to taxation equalisation reserve. The net surplus carried forward is £1,096,012 after deducting £171,443 for dividends paid in respect of the year. During the year the authorised capital was increased to £10,000,000 and has subsequently been increased still further to £12,500,000. Volume of sales rose to a record figure.

Richard Thomas & Baldwins Limited.—The annual general meeting of Richard Thomas & Baldwins Limited was held in London on September 6. Mr. E. H. Lever, Chairman & Managing Director, moved the adoption of the report and accounts for the year ended March 31, 1951, and the payment of a dividend at the rate of 15 per cent. on the ordinary stock, less income tax, for the period February 15 to March 31. Mr. S. J. L. Hardie, Chairman of the Iron & Steel Corporation of Great Britain, seconded the resolution, which was carried.

Head, Wrightson & Co. Ltd.—The final dividend is 5 per cent. on the ordinary shares of Head, Wrightson & Co. Ltd., for the year ended April 30 (against 6 per cent. for the previous year). The net amount absorbed by the interim and final dividends will be £28,498 (£32,485). The final dividend together with the interim of 4 per cent., makes a total dividend of 9 per cent. (10 per cent.). Profits, and so on, for the year were:—Group gross profits, £678,448 (£637,409); depreciation, £87,510 (£87,808); taxation provision, £346,500 (£301,285); group net profits, £244,438 (£248,316).

Kelvin & Hughes Limited.—Mr. R. Gordon-Smith, Chairman of Kelvin & Hughes Limited, stated at the recent annual general meeting that in common

with other companies they were faced by financial problems arising from increasing production and from the inflation of all costs. The net profit, at £57,000, showed an improvement of £12,000 over the previous year, but this was due to the inclusion of £23,000 for provisions previously made and no longer required. The reduction in trading profit was due to increased costs as turnover was at the same level. Since the end of 1950 orders received from commercial sources had been increasing rapidly in all three sales divisions, resulting in the largest commercial order book in their history.

Saunders Valve Co. Ltd.—The net profit of the Saunders Valve Co. Ltd. and its subsidiary for the year ended April 30 amounted to £148,721 against £138,745 in the previous year. Income tax absorbed £83,078, against £77,854, leaving an available profit of £65,643, against £60,891. An amount of £25,000 as compared with £25,000 is transferred to general reserve and £15,000 against £11,879 gross to reserve for future income tax which now totals £80,000. It is proposed to pay a final dividend of 10 per cent., less income tax, which, with the interim dividend of 6 per cent. already paid, gives a total distribution of 16 per cent., making £21,375 against £22,000, and to carry forward the balance of £7,913.

Morgan Crucible Co. Ltd.—Group trading profit of the Morgan Crucible Co. Ltd. for the year ended March 31 expanded by £382,414 to £1,612.433. With the addition of investment income, total profit was brought up to £1,660,336, compared with £1,263,128. Group profit, before taxation, was £1,516,976, compared with £1,135,046. During the year productivity showed an increase of 16 per cent. above the average of the past three years. The increased sales turnover is attributed to a growth in volume of sales as opposed to increase in prices. The balance sheet shows that current assets have risen from £4,036,543 to £5.378,342, with current liabilities and provisions at £1,398,616, compared with £1,326,612.

Forthcoming Meetings

September 24 (*Mon.*) & 25 (*Tue.*).—International Electrotechnical Commission, Technical Committee No. 9 (Electric Traction Equipment); meeting at British Standards Institution, 28, Victoria Street, S.W.1.

September 26 (*Wed.*) to October 6 (*Sat.*).—International Timetable & Through Carriage Conference at Oslo, Norway.

September 26 (*Wed.*).—East Indian Railway Officers' Association, 48th Annual Dinner, at the Connaught Rooms, Great Queen Street, London, W.C.2.

September 27 (*Thu.*).—East Indian Railway Officers' Association, tea-party, at St. Ermins Hotel, Caxton Street, London, S.W.1.

September 27 (*Thu.*).—Engineers' Guild, Metropolitan Branch, at Caxton Hall, Caxton Street, London, S.W.1, at 6 p.m. Annual general meeting.

September 28 (*Fri.*).—Newcomen Society, Autumn meeting, devoted to transversing the routes of early railways in Surrey, starting by coach at 9.30 a.m., under the guidance of Mr. Charles E. Lee.

September 29 (*Sat.*).—Permanent Way Institution, London Section, visit to Westinghouse Brake & Signal Co. Ltd. Chippenham Works.

Railway Stock Market

Japanese and German bonds and overseas securities have stood out actively in markets which were otherwise again cautious because of dividend limitation and a waiting attitude caused by renewed talk of an early general election. The latter has made buyers go cautiously in the gilt-edged market where sentiment has also been affected by the growing view that higher money rates seem inevitable in the future, which would of course imply higher yields and lower market prices for fixed-interest securities.

Good features have not been lacking in industrials, although they were mainly among shares of companies which have recently reduced their dividends to comply with the Gaitskell limitation plan. This reflects hopes that if an election brought a change of Government it would mean an end of the dividend freeze, and then most companies would distribute special payments to shareholders to make good the cuts recently suffered by them.

The prevailing belief is that until the election rumour is either denied or confirmed, and until the future of dividend limitation is finally settled, market interest is likely to continue to centre in the main on overseas securities. The renewed strong speculative activity in Japanese and German bonds is due to hopeful forecasts that debt settlements are likely to be arranged which may provide for payment in full to bondholders.

Foreign rails remained rather more active, but in general movements were small and irregular, though there was renewed demand for Antofagasta stocks which put the ordinary up to 17¼ and the preference to 77½. Bolivar "C" debentures were quoted at 17 "ex" the return of capital and La Guaira ordinary stock at 92. Manila "A" debentures showed firmness at 82; the preference shares were 9s. 9d.

Although still active awaiting the nationalisation terms, United of Havana stocks have not kept best prices and the 5 per cent. (1906) debentures were 21½.

Leopoldina stocks were steady, but failed to attract buyers, although current prices are below the expected "pay-outs" for the stocks. Nevertheless, the market remains rather more hopeful that there will be no further long delay by Brazil in releasing the compensation money. Leopoldina ordinary changed hands around 10¾, the preference stock was 25¾, the 4 per cent. debentures 92½ and the 6½ per cent. debentures 138. Leopoldina 5 per cent. debentures eased to 95 after their recent rise; the ordinary units were better at 1s. 9d.

Elsewhere, Nitrate Rails shares were 24s. 9d. and Taltal 19s. Mexican stocks attracted at higher levels, with Mexican Central "A" bonds at 70¼, and National of Mexico 4½ per cent. non-assented at 44.

With other dollar stocks, Canadian Pacifics attracted some profit-taking following their recent big rise, and came back to $67¾. In view of the substantial rise in price shown this year it is hardly surprising that profit-taking is being encountered; but on the other hand, the rather lower prices have been attracting fresh buying this week because it is assumed the railway will benefit substantially in the future from the big oil developments projected in the Dominion. Canadian Pacific 4 per cent. preference stock was 75½ and the 4 per cent. debentures 92½.

Algoma Central 5 per cent. first mortgage debentures were $249 and White Pass Yukon income debentures 93.

Road transport shares have been less firm, although little selling was reported. West Riding were 45s. 6d., Southdown 93s. 9d. and Lancashire Transport 58s. B.E.T. deferred stock came back to £480.

Engineering shares were inclined to strengthen with industrials because of election talk; it is hoped in the market that an election would end dividend limitation. Vickers were strong up to 50s. 3d. in advance of the interim dividend, which will be known by the time these notes are in print. The market expects the interim to be kept at 2½ per cent., but if limitation were to become law, the maximum dividend total the company could pay would be 9¾ per cent., against last year's 12½ per cent. total. The latter followed a 6¼ per cent. total, and the average of these two payments, namely 9⅜ per cent., is the Gaitskell maximum.

Babcock & Wilcox rose further to 79s. 6d. and Cammell Laird 5s. units moved up to 13s. 6d., while B.S.A. were better at 43s. 6d. T. W. Ward have been firm at 70s. 6d.

Among locomotive building and engineering shares, Hurst Nelson eased to 58s. 9d. at Glasgow, Birmingham Carriage were 37s. 6d., North British Locomotive 18s. 9d., Beyer Peacock 31s. 6d., Gloucester Wagon 16s., Vulcan Foundry 27s. 3d., and Charles Roberts rose to 103s. 9d.

Traffic Table of Overseas and Foreign Railways

	Railway	Miles open	Week ended	Traffics for week: Total this year	Traffics for week: Inc. or dec. compared with 1949/50	No. of week	Aggregate traffics to date: Total 1950/51	Aggregate traffics to date: Increase or decrease
South & Cen. America	Antofagasta ...	811	7.9.51	£ 96,390	+ £ 19,440	36	£ 4,245,260	+ £ 1,959,576
	Costa Rica ...	281	June, 1951	c1,121,590	+ c25,461	52	c11,300,123	+ c720,146
	Dorada	70	July, 1951	37,711	— 1,667	30	251,471	— 19,079
	Inter. Ctl. Amer. ...	794	July, 1951	$1,039,745	— $53,042	30	$7,971,396	— $152,622
	Paraguay Cent. ...	274	7.9.51	£367,889	+ £172,954	10	£3,365,605	+ £1,536,025
	Peru Corp. ...	1,050	Aug., 1951	$8,659,000	+ $529,000	9	$16,584,000	+ $979,000
	" (Bolivian Section)	66	Aug., 1951	Bs. 13,962,000	+ Bs.6,308,000	9	Bs. 26,991,000	+ Bs.11,506,000
	Salvador	100	May, 1951	c138,000	+ c31,000	48	c1,867,000	+ c136,000
	Taltal	147	Aug., 1951	$2,065,000	+ $528,500	9	$3,885,000	+ $1,086,600
Canada	Canadian National†	23,473	July, 1951	17,681,000	+ 895,000	30	117,434,000	+ 15,331,000
	Canadian Pacific† ...	17,037	July, 1951	11,932,000	+ 873,000	30	80,924,000	+ 10,763,000
Various	Barsi Light* ...	167	July 1951	55,627	+ 9,833	17	168,750	+ 33,705
	Egyptian Delta ...	607	10.4.51	17,513	— 267	4	17,513	— 267
	Gold Coast ...	536	July, 1951	254,368	+ 17,091	17	1,058,909	+ 99,114
	Mid. of W. Australia	277	June, 1951	43,627	+ 8,943	52	497,708	+ 117,766
	South Africa ...	13,398	18.8.51	1,898,436	+ 179,126	20	37,704,890	+ 5,256,493
	Victoria	4,744	Apr., 1951	1,793,401	+ 71,930	43	—	—

* Receipts are calculated at 1s. 6d. to the rupee † Calculated at $3 to £1